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Public Health

The order in this section is:—**General; Vital Statistics; Epidemiology; Maternal and Child Health; Health of Students, Nurses and Hospital Staffs; Health of Old Persons and the Chronically Ill; Chronic Cardio-Respiratory Diseases; Chronic Rheumatism; Cancer; Miscellaneous Diseases; Dental Health; Mental Health.**

GENERAL

COTLAND. **Report of the Department of Health for Scotland 1959** [HADDOW, T. D., Secretary]. Cmnd. 983. 133 pp. 1960. London: H.M. Stationery Office. [7s.]

This annual Report is as comprehensive and valuable s ever [for the 1958 Report see this *Bulletin*, 1959, 34, 972].

The birth rate remains high at 19·1; the death rate is ot given; the rate of infant mortality was 28·4; the eo-natal, 19·4; maternal, 0·4; stillbirth rate, 22·2. After ıfancy the greatest single cause of mortality up to the ge of 35 was accidents: after 35 it was cardio-vascular isease.

An annual Statistical Report is now being published eparately and many figures included in previous annual eports of the Department of Health are no longer to e found there.

Problems of the "traditional infectious diseases" are assing away and being replaced by those of the "com- ıon cold, pneumonia, dysentery, gastro-enteritis, food oisoning, and the troublesome staphylococcus" and ıose of the "health aspects in delinquency, maladjust- ıent and neuroses".

Fewer serious defects are being discovered at routine chool medical inspections; an investigation is being ndertaken to test the practicability of alternative ıethods of screening the school population.

In the chapter on care of the aged it is emphasized ıat the increase in the number of old people is due ıainly to more survivals from the younger ages and ardly at all to an increased expectation of life of those vho live to 60 or more. The work of supervisory clinics or the aged is commended and the diverse problems ssociated with old age are discussed at some length.

In the early months of 1959 there was a wave of ıfluenza due to the Asian type of virus, other types of A and some B. A Virological Institute is to be estab- ished in Glasgow. The incidence of poliomyelitis was ow and almost exclusively caused by type I virus.

The death rate from respiratory tuberculosis has declined further to 11, and the notification rate to 74, per 100,000. The number of hospital beds occupied by the tuberculous at the end of the year was 2,223 compared with 5,149 four years earlier.

The death rate from bronchitis is declining but the disease still causes 10% of all newly certified incapacities for work among males.

Mental health receives close attention in a special chapter. At the end of the year there were 20,229 patients in mental hospitals and 5,958 on the registers of institutions for the mentally defective. There is much activity in implementing modern views on community care for mental patients and the provision of congenial occupation for them. An unusual innovation is the holiday exchange of patients between mental hospitals.

The general medical service is provided by 2,653 doctors acting as "principals" (a net increase of 14) and 230 ordinary and 57 trainee assistants. The average number of patients on each list remains relatively unchanged at 1,985. A general practitioners' diagnostic centre has been established in Edinburgh.

The costs of the general dental, pharmaceutical and supplementary ophthalmic services are all growing. The 2 Health Centres continue to work smoothly.

On the local authority side there is a tendency to "reshape their services to meet the demands of a changing society". In one area all hospital discharges of people over 70 are notified to the local medical officer of health. Increasing attention is being paid to the early ascertainment of deafness.

The number of staffed hospital beds fell by 90 during the year to 63,860 but there are many plans in hand for building new hospitals and expanding others. Work study in many aspects of hospital administration is proceeding apace.

The number of consultants and senior hospital medical officers is now 1,354 compared with 970 in 1950.

Welfare, Food and Housing occupy considerable space

in the volume. In 1959, 27,293 new houses were completed, making since the war ended 381,043. Since 1945 one family in 4 has moved into a new house. Old property is being modernized by the aid of grants and slum clearance continues.

There was capital expenditure of £7·4 millions in the year on public water supplies, sewage schemes and other sanitary work.

Throughout the report there are indications of new thinking about old problems, and of careful preparation for the advent of new ones, which will be most helpful to all engaged in the administration of health services. *Allen Daley*

IRELAND, REPUBLIC OF. MINISTRY OF HEALTH **Report on Vital Statistics 1957.** Compiled by the Central Statistics Office. pp. xxxvi + 159, 5 diagrams. 1960. Dublin: Govt. Publications Sales Office, G.P.O. Arcade. [6s.]

The principal statistics for 1957 have already been published but this report provides all the detail that a student of bio-statistics could need.

The estimated population of the Republic of Ireland was 2,885,000. Until the turn of the century there was an excess of females over males: now there are 1,456,000 males and 1,429,000 females. At the last census there were 18 male and 12 female centenarians.

The marriage rate was 5·1, the lowest since 1935; the birth rate 21·2 and the death rate 11·9; the death rate from tuberculosis was 0·24 and has declined steadily since 1947 when it was 1·24. All the above rates are per 1,000 population.

Illegitimate births were 1·7% of all births which was the lowest percentage for 80 years.

30% of the total deaths were certified as due to diseases of the heart, 14% to malignant neoplasms, 11·2% to vascular lesions affecting the central nervous system and 2% to tuberculosis (all forms). The cancer death rate is rising and was 1·62 compared with 1·52 in 1956.

The rate of infant mortality was 33·1 per 1,000 live births and had never been lower: it compares with 23 in England and Wales and 29 in Scotland. The neonatal mortality was 22 per 1,000 live births and the maternal mortality 1·32 per 1,000 births.

For the principal vital statistics comparable figures are given for Northern Ireland, Scotland and England and Wales. In the Republic the marriage rate is persistently lower but the birth rate is higher than in Great Britain and it is only in 1956 and 1957 that Northern Ireland has had a slightly higher rate than its southern neighbour. The death rate is higher in the Republic than in England and Wales or Northern Ireland and is about the same as in Scotland.

The section on the marriage rate is an interesting study in sociology. The rate is traditionally low and the age at marriage high but as in other countries the Irish are now marrying at younger ages than they did. The average age of the groom in 1957 was 31·7 years and of the bride 27·6 compared with 33·1 and 28·0 in 1945–6. 95·2% of the marriages were in accordance with the rites of the Catholic Church. Classifie social groups the highest average age at marriage among farmers where it was 36·6 years. 14% o newly married intended to reside outside the Re but many of them already lived elsewhere and returned " home " for the marriage ceremony.

The section on births gives full information abou ages of the mothers, their parity and the previous tion of marriage. The main features are that families are larger than in other parts of the B Isles and that the proportion of child-bearing moth the older age-groups is higher. The mothers of of the babies born in the Republic in 1956 were ag or over: in other parts of the British Isles the figur 3·1%.

Since the beginning of the century there have striking falls in the death rates at the younger age little change among those aged 65+.

The classification of deaths follows the Sixth national Revision. Tables give the age and sex b down for the main administrative divisions of the try and the principal causes of death.

Lack of medical certification of the cause of dea still a problem and amounted to 7·1% of all deat 1957 but that is a great improvement on 1938 wh was 16·0%. It is not surprising that " senility " i recorded cause of death of 84·9 per 100,000.

Tables show that the death rate from cancer o lung is increasing but at 21·0 per 100,000 populati is still less than half the rate for England and W the rate for males over 65 has, however, increase fold between 1925 and 1957 and for females of ages, 10-fold. *Allen Da*

MOULDING, T. & ROSA, F. **The Doctor in Internat Health—United States sponsored Progran Iran.** *Amer. J. Pub. Health.* 1960, May, v No. 5, 696–708, 4 figs.

The programme referred to in the title was knov the Technical Cooperation Program (TCP), ar involved financial contributions from the United and from the Government of Iran; it was directe American and Iranian doctors with progressive ass tion of responsibility by the Iranians.

A preliminary survey of existing medical institu in Iran showed 115 hospitals and 350 clinics de primarily to care of the sick, with very few activiti prevention of illness. This, say the authors, " is t of many less industrialized countries and is largel responsibility of Western medical education, which does not place sufficient emphasis on public health.

A short account is given of the malaria control gramme which has been very successful in many where 5 years ago the prevalence of the disease wa 90%; the result is better health and increased pr tivity. Other programmes could not be so easily c out, but much progress has been made in pro protected wells and concrete latrine slabs. The v work was carried out largely by trained young mer were responsible for instruction of the villagers; have made a marked improvement in health habit

andards, and a training school has been established for ich men. The authors express strong views on the alue of health education, and observe that all possible eans such as radio and loud-speaker talks, and posters, ould be used when mass immunization is required in ce of an epidemic. Important features are school health and the instruction of women, and particularly of midwives.

"Throughout much of the less technically developed world, there is an intense desire for increased knowledge. Too few facilities exist to fulfil this desire."

Charles Wilcocks

EPIDEMIOLOGY

CARTWRIGHT, Ann. **The Families and Individuals who did not Cooperate on a Sample Survey.** *Milbank Memorial Fund Quarterly.* 1959, Oct., v. 37, No. 4, 347–68.

This health survey was carried out on a new housing state near London. The aim was to interview the adult members of a sample of households comprising 3,040 persons; each person was to be interviewed twice at an interval of a month. The 2 interviews were obtained from 80·8%, 1 interview from 4·7% and no interview from 14·5% of the sample population. The principal reason for failure was refusal to co-operate, and the highest failure rate occurred among the young unmarried adults. Information about the sample population was available from the records both of the housing authority and the general practitioners on the estate. Comparisons between those who gave 2 interviews, 1 interview and no interview showed certain differences between the 'partial co-operators' (1 interview) and the other 2 groups. In particular, these people had been granted more priority for rehousing on medical grounds than either those who co-operate fully or the non-co-operators, and although they were reported as having a similar number of illnesses during the 12 months of the survey, they consulted their general practitioners more frequently than the other 2 groups. Possible reasons for the differences found are discussed. *S. P. W. Chave*

THOMPSON, D. J. & CIOCCO, A. **Sickness, Change of Residence, and Death. II. Sickness reported in Household Surveys and Subsequent Mortality.** *Brit. J. Preventive & Social Med.* 1959, Jan., v. 13, No. 1, 28–32.

"This is a report on the mortality experience of (*a*) a sample of 2,712 persons aged 21 years and over, resident in Donora, Pennsylvania, who were surveyed in 1948 to determine illness status with respect to the smog episode of that year and were re-surveyed in 1957; (*b*) a sample of 6,305 persons aged 21 years and over, resident in the Arsenal Health District, who were surveyed in 1951 to determine the presence or absence of sickness and for whom information on mortality up to 1956 was obtained.

"In a previous paper it was reported that, in both samples, persons who claimed they were ill in the original survey died at a higher rate during the 8 and 5 year interval respectively before the second survey than persons who claimed no illness. Further analysis of the relationship of the type of illness to cause of death is reported in this paper. The major findings of this analysis are:

"(1) The ill groups had higher mortality from heart disease in most age-sex subdivisions.

"(2) Persons who complained of heart disease had a higher mortality than others.

"(3) Persons who complained of heart disease died more often from heart disease, and those who complained of certain other conditions died more often from other causes of death.

"These findings point to the value of information obtained from household surveys as a means of recognizing persons with a relatively higher risk of mortality. At least for the complaints classified as heart disease, the higher risk of dying and of dying from heart disease is apparent in the two samples. For other complaints and their possible relationship with other causes of death, more observations are required. Further analysis of the available information on these samples is also required to learn about the duration of the higher risk of mortality for the persons ill. These findings lead also to the general consideration that, if the survey of the type undertaken in Donora and the Arsenal does in fact indicate persons with higher risk of mortality from specific causes, such surveys can be used as a means for exploring more effectively the antecedent factors of the causes of death."

KIDD, C. W. & PARK, A. T. **Sick Leave among Civil Servants in the Northern Ireland Government.** *Med. Officer.* 1960, June 10, v. 103, No. 24, 339–42.

During 1958 the average number of days of uncertified sick leave for civil servants in the Northern Ireland service was 0·9 for men and 1·6 for women. There was little variation by age or grade, although the women aged under 30 years had more days than the older women. The certified sick leave for non-industrial civil servants averaged 9·8 days for males and 9·7 days for females. There was a progressive increase in the length of sick leave with age: the oldest age-groups had 17·7 days for males and 18·1 for females. The average days of certified sick leave for other grades was 20·2 for messengers, 16·7 for cleaners and 12·1 for industrial workers. The number of days of sickness among the rest of the insured population of Northern Ireland was 19·4 for men and 19·6 for women. Although the civil

servants had a much lower average number of days lost than the general population they had more spells of sickness; the males had 53% compared with 35% in the insured population.

The most frequent causes of sickness among males were:—ill defined diseases, 1·1 days, and influenza, 1·0 day, for the non-industrial civil servants; bronchitis, 4·0 days for messengers and 4·7 days for cleaners; accidents, 2·6 days for industrial workers; ill defined diseases, 3·2 days for the insured population.

There did not appear to be any appreciable difference in the days of sick leave of civil servants in Northern Ireland and Great Britain. *W. J. Martin*

SHEERBOOM, D. J. **The Causes of Compulsory Medical Retirement in a Local Authority.** *Med. Officer.* 1960, June 10, v. 103, No. 24, 342–5.

The number of persons employed by the Corporation of Bristol is just over 12,000. During 1955–59 a total of 190 persons had to be prematurely discharged for medical reasons. 115 (61%) were under the age of 60.

Despite the initial examination at entry 46 persons had to be retired before they had completed 10 years' service, although most of the persons with short service had not been accepted for superannuation because of their previous medical histories or physical condition at time of appointment. The unskilled and semi-skilled workers formed the majority of the premature retirements; 162 persons were light or heavy manual workers and 28 were in professional or clerical posts. The most frequent causes of retirement were diseases of the circulatory system, 54 persons; diseases of the respiratory system, 53 persons; and diseases of the bones and organs of movement, 24 persons. The most prevalent individual cause was bronchitis, 48 men and 1 woman. Over half of those with bronchitis were exposed to the weather all the year and some of the remainder had a dust or fume risk.

A study of 2 years showed that 238 persons were pensioned on reaching retirement age, 50 were prematurely retired and 52 died. Thus only 2 out of 3 persons were able to reach normal retiring age. This see very poor performance and might be improved by preventive and ordinary medical care.

[There is a misprint in Table II, causes of retire where the items add to 192 instead of 190.]

W. J. Mar

CEINO, O. & DEL MASTRO, Simonetta. Attuale incic delle morti per tuberculosi e pneumonopati Italia. [**Present-day Incidence of Deaths Tuberculosis and other Lung Diseases in I** *Lotta c. la Tuberculosi.* 1960, Jan.-Feb., v. 30, 1/2, 40–55, 6 figs. [Refs. in footnotes.]

Taking his figures from those compiled by the Ce Statistical Institute at Rome for 1957 the authors di deaths from (a) tuberculosis (all forms); (b) mali growths of trachea, bronchi, and lungs; (c) bro pulmonary conditions [not further defined]; (d) respiratory diseases which includes asthma, bro ectasis, etc. and compare the incidence in each of t great administrative regions of Italy.

In general deaths from pulmonary tuberculosis, c of the respiratory tract, and other respiratory dis were higher in the Northern regions especially Aosta and Trentino-Alto Adige and particular me is made about the low incidence of lung tuberc Basilicata and Calabria in the south where the star of living is practically the lowest in Italy. In all, ease of the respiratory tract make up 13% of all d while bronchial asthma is 13th in the list of caus death. Here in this section (d) the southern regio Sicily, Apulia and Basilicata show the lowest figures authors mention that Sardinia, Calabria and Basil are the regions where most undiagnosed deaths registered.

[It seems peculiar that the regions with the gre number of undiagnosed deaths should be among where the highest incidence of deaths from infec and parasitic diseases are registered].

W. K. Dunscom

MATERNAL AND CHILD HEALTH

LAMBERT, C. Contribution à l'étude des problèmes de la protection maternelle et infantile en milieu rural congolais. [**Problems of Maternal and Child Health in Rural Congo**] *Acta Tropica.* Basle. 1960, v. 17, No. 2, 138–78, 3 figs. [19 refs.]

This paper, which presents the philosophy of one who appears to have done a life's work in the African bush, makes very pleasant reading. Much of its detail, concerned with the management and pathology of pregnancy, etc., is outside the scope of this *Bulletin,* but views on recruitment and training from such a source command respect.

A doctor who wishes to forward community heal the African bush is unlikely to have European assist and therefore must rely on locally recruited staff whose selection and training depend success or fa The qualities to be looked for are (1) absence o average fatalistic indifference, (2) ready acceptanc discipline, (3) initiative, (4) perseverance, (5) aptitud command—the will for achievement, perseveranc creative effort, ability to learn from the mistakes must be made from time to time. The chief assista likely to be chosen from the nursing staff after m observation of character.

The author's ideas are in accord with those of o

who have worked on rural African health, though few would demand such standards of Christian abstinence, or proceed to call in the aid of somatotyping. The point which the author does put across is the vital importance of being certain whom one wants to recruit, and how to choose them. He goes on to emphasize the necessity of thorough supervision, over which everyone concerned with rural medical services is agreed, and just but severe discipline. He favours giving training to local matrons already practising as midwives, as well as recruiting younger girls for complete training. He makes out a good case for the social centre as an attractive and useful means of improving the woman's domestic skills, hygiene, and general outlook on life. *B. B. Waddy*

PARENT, M. Le nouveau-né au Katanga. [**The Newborn Infant in Katanga**] *Problèmes Sociaux Congolais.* 1960, Mar., No. 48, 43–58. [10 refs.]

AITKEN, F. C. & HYTTEN, F. E. **Infant Feeding: Comparison of Breast and Artificial Feeding.** *Nutrition Abstracts & Reviews.* 1960, Apr., v. 30, No. 2, 341–71, 1 fig. [Numerous refs.]

This article reviews current practice in breast-feeding and artificial feeding; compares the nutrient values of human milk with cows' milk, and the observed effects of each on growth, morbidity, and mortality; and examines the basis for the assessment of adequacy of food-intake of individual infants, and the feeding and assessment of progress in premature infants.

There is a trend toward the early or complete replacement of breast-milk by cows' milk in sophisticated societies. Little is known of the milk-yield and there are considerable variations throughout human lactation. A few women fail at the outset to satisfy their babies, and more cannot keep pace with the demands of the growing child.

Most artificial feeds are simple mixtures of cows' milk (including evaporated, and dried milk), carbohydrate, and water, with vitamin-supplements. There are wide variations in the composition of milk-feeds, mostly through variations in dilution and in the proportion and type of added sugar. The average weight-gain from birth to six months is much the same for all milk-mixtures in current use, and if given with vitamin-supplements in quantities sufficient to satisfy energy-needs, they supply required nutrients in abundance, apart from iron. Detailed comparisons of the quantity and quality of specific nutrients in cows' milk and human milk are stated and discussed, to show that in many respects cows' milk compares favourably with human milk, and that the comparatively few nutrients that are deficient in cows' milk-mixtures, as compared with human milk, may be added as supplements to feeds. Iron is deficient, but normal infants have sufficient body-reserves of iron for the first few months of life, and thereafter must depend for iron upon solid foods.

It is difficult to make a fair comparison between the development of breast-fed and artificially fed infants, but recent studies in advanced communities show that babies weaned early make greater gains than those weaned late. The argument that breast-feeding protects the infant from infection has been the subject of few scientific investigations, and is extremely difficult to confirm. Under modern standards of hygiene, bottle-fed infants suffer no higher overall incidence of infections throughout infancy than breast-fed infants, but there is a lower incidence of gastro-intestinal infections during exclusive breast-feeding, due to the greater risk of contamination of prepared feeds. Experience today in less developed countries reflects that in the United Kingdom 30–40 years ago, when the poor hygiene associated with artificial feeding resulted in excessive mortality with a lower gain of weight in the first year of life.

The feeding and progress of infants is most commonly assessed by the comparison of serial weighings with some standard of weight for age, or of cumulative weight-gain. The infant whose weight-gain lies near the top of the standard range is making good progress, but the infant whose gain is near the bottom may be growing as well as he can, or he may be underfed. Comparison of energy-intake with estimated energy-requirement offers no solution of this problem. Comparison of observed with standard weight-gains may be supplemented by clinical appraisal to discover the underfed infant, but the best test is to offer more food.

Special consideration has been given to the feeding of premature infants (conventionally those with birth-weights below 5½ lb.). They need iron from about six weeks of age, and vitamin supplements. At least one-third of those classed as "premature" are probably mature in physiological terms, and weight-gain is on the average independent of the type of feed customarily offered. Among very small premature infants weight-gains with evaporated milk-mixtures exceed those obtained with human milk, and still greater gains are achieved with partly skimmed cows' milk-mixtures, or human milk supplemented with protein or amino acids. These variations of weight-gain with different types of artificial feeding add to the problems of assessment of progress in very small premature infants.

Aitken and Hytten conclude that artificial feeding on simple mixtures of cows' milk, water, and sugar is a satisfactory substitute for breast-feeding, and that evidence from average energy-intake and weight-gain suggests that less than the best is perhaps being accepted as satisfactory breast-feeding. Very small premature infants on a simple cows' milk mixture gain more weight and show no clinical disavantage compared with babies on human milk.

[This informative and concentrated review cannot be adequately abstracted. It should be read in full by those interested in infant-feeding and is available as a reprint. The comparison of artificial and breast-feeding is made primarily from the point of view of nutrition, by the comparisons of nutrients and of resulting infant-growth; other important medical and social aspects of infant-feeding are outside the scope of the paper, and receive less emphasis. The authors' conclusions on the adequacy of artificial feeding are based on practice in countries with well organized milk-industries, and high standards of hygiene and medical care. The difficulties and risks of artificial feeding in general practice in most tropical countries are still formidable.] *T. P. Eddy*

SLOME, C. **Culture and the Problem of Human Weaning.** *J. Trop. Pediatrics.* London. 1960, June, v. 6, No. 1, 23–34. [38 refs.]

Weaning is beginning to be recognized as a hazardous, rather than a natural process in man. The time and method is culturally determined and often specific to each society; the causes of weaning differ widely. Western mothers depend mainly upon the early and gradual introduction of dietary supplements, with bottle or teat available to meet the sucking demands of the infant which is weaned early. In unsophisticated societies, mothers often introduce supplementary foods early in infancy—premasticated foods, gruels, or curds; breast-feeding lasts much longer, and the breast, as milk becomes minimal, becomes used as a comforter. Ultimately, various applications or measures are used to make the breast distasteful to the child. This forcible weaning is the first disciplinary action and causes the first barrier between mother and child. Studies of Zulu babies weaned by the application of bitter aloe juice to the nipples between the ages of 18 and 24 months have demonstrated behaviour disturbances, followed by positive attempts to gain the mother's love, and finally a sudden increase in maturity of behaviour from the 5th to the 13th day of weaning. The necessity to enter into family life and compete with fellow children for food, leads to rivalry and emotional attachment to others. Weaning has been known for centuries as a time of stress, and it is possible that non-dietary stresses, as well as the deprivation of breast milk and substitution of carbohydrate, are concerned in the pathogenesis of kwashiorkor in African babies.

With its evolution, the human infant is entirely dependent for feeding, and only relatively late in life is it able to obtain its own food and feed itself. The infants of our evolutionary predecessors were less dependent, and in most lower mammal species the young acquire the species-feeding habits, so progressing to self-weaning and mature self-sufficiency with no conscious entry of the mother into the process. In contrast, the conscious entry into weaning by the mother deciding the time and method is constant in all human beings, whether sophisticated or not.

Unsophisticated societies wean later than present day Western mothers, but with increasing Western culture weaning may occur earlier in infancy in all societies, thus raising the evolutionary possibility of increasing reproduction of women incapable of breast-feeding, to a stage when the human race would be entirely dep dent upon the production of artificial foods. Diet cally the loss of breast-milk may be made good v artificial complements, especially cows' milk. It argued that babies never breast-fed do as well as oth who are breast-fed for years; but there are possibili of psychological trauma, the early laying down diatheses of ill health which may be manifested in adult, and the problem of supply of adequate foods replacement of breast-milk. The plight of Westerni groups without access to essential foods is becom increasingly difficult. In contrast to detailed resea on nutritional requirements of breast-feeding and we ing there has been too little prospective research into long-term effects on health and psychology to confi many suggested possibilities, and these problems requ a long-term study of all concerned, mother, child a family.

Meanwhile, dogmatic systems of weaning should avoided, and the child treated as "one unto itsel The child should be slowly accustomed to the fo available, permitting it to wean itself when it reac that stage of maturity and development. It is possi that the Zulu mother does this by weaning the ch when it is ready for the next step to maturity.

T. P. Edd

KAHN, E. & FREEDMAN, M. L. **The Physical Devel ment of a Privileged Group of African Childr** *Pub. Health.* Johannesburg. 1960, May, v. No. 5, 31–3. [10 refs.]

Available information indicates that African child are shorter and lighter than white children in So Africa, British children and American children, of same ages. The authors were able to measure 72 Afri boys and 71 African girls, under the age of 11 ye whose mothers were fully qualified nursing sis employed in Johannesburg, and who were theref brought up in good conditions. The boys compa favourably with "superior" American children, and girls rather less so. The mothers were about the sa height as Canadian women.

The survey therefore indicates that the stunted co tion of African children is due to environmental, hereditary factors, and of these poor nutrition, chro diseases (especially tuberculosis and probably intest infections), and frequent attacks of acute debilita diseases are the most important. *Charles Wilcock*

HEALTH OF STUDENTS, NURSES AND HOSPITAL STAFFS

QUEEN'S UNIVERSITY OF BELFAST. **Student Health Committee. Report of Medical Officer** [JOHNSTON, W.]. Eleventh Annual Report. Academic Year 1959–59. 7 mimeographed pp.+22 pp. of tables. [1960].

This report follows the pattern which is already familiar to readers of this *Bulletin* [1958, v. 33, 631; 1959, v. 34, 723].

Part I is a general survey of the year's work wh comprised routine examination of new entrants and service of medical advice and treatment to students members of the staff attending for consultation or be visited in their homes or lodgings.

Consultations by students increased from 4,126 1957–1958 to 6,275 although routine examinati increased only from 697 to 780. This disproportio

ncrease is not explained. No major outbreak of influ-enza occurred, and the general health of the students vas good.

There was no increase in the number of students with psychoneuroses but the series included a greater number of the more severe types requiring specialist treatment; 2 students required prolonged treatment in hospital. "Undoubtedly the majority would have broken down, sooner or later, in any walk of life, but in a few this vas probably precipitated by the special strain and stress peculiar to university life . . . .".

Part II deals with tuberculosis. No cases of active uberculosis were discovered in the 780 new entrants examined by X-ray but 4 of the 2,398 other undergraduates were found to have active tuberculosis. No student in either group failed to attend for examination. The medical officer presumes that the disease was contracted outside the university. [This presumption would be greatly strengthened if members of the academic and other staff of the university were subjected to the same compulsory radiography survey as the students.]

366 students were tested with tuberculin as candidates for BCG vaccination; the number vaccinated with BCG was 28. The small number of vaccinations is attributed to the competing claim of vaccination against poliomyelitis. *H. G. Calwell*

CHRONIC CARDIO-RESPIRATORY DISEASES

ZUKEL, W. J., LEWIS, R. H., ENTERLINE, P. E., PAINTER, R. C., RALSTON, L. S., FAWCETT, R. M., MEREDITH, Alla P. & PETERSON, B. **A Short-Term Community Study of the Epidemiology of Coronary Heart Disease. A Preliminary Report on the North Dakota Study.** *Amer. J. Pub. Health.* 1959, Dec., v. 49, No. 12, 1630–39.

The purpose of the study here described in a prelim-inary report was (1) to determine the feasibility of studying the epidemiology of coronary heart disease (CHD) in a general population by using the pooled experience of practising physicians, (2) to compare the incidence of diagnosed CHD among farmers and among other occupational groups, and (3) to determine by inter-view the characteristics of persons developing CHD as contrasted with the characteristics of the general population.

The methods of this study of the Heart Disease Con-trol Program of the Public Health Service are fully described. Information on new or recurring cases of CHD was obtained over a period of 1 year from about 100 physicians practising in 6 counties of North Dakota which have a general population of 106,000. This information and that obtained from additional sources was reviewed by a committee and many interviews with patients or their survivors and control persons were carried out. The study was restricted to males aged 35 years and over, and of these there were about 20,000 in the total population. The total number of cases of CHD was 228.

The preliminary results of the study are described and tables set out the findings of incidence of CHD by specific diagnosis, occupation (farming compared with other occupations), age and cigarette smoking history.

"Initial findings in 228 males 35 years of age and over considered to be CHD cases by a review committee of internists show that a lower incidence of CHD occurred in farmers than in males in other occupational groups; that there was a higher incidence of CHD in cigarette smokers than non smokers; that lack of physical activity was also probably related to CHD. Comparison of recent dietary histories of cases and controls revealed no differences in mean caloric intake, total fat consump-tion, or other major dietary constituents."

M. E. Delafield

See also p. 964, HIGGINS, COCHRANE, GILSON & WOOD. **Population Studies of Chronic Respiratory Disease. Comparison of Miners, Foundryworkers and others in Staveley, Derbyshire.**

CANCER

LEGUÉRINAIS, J., LAURENT, C. & MAUJOL, L. Présenta-tion des cas de cancer chez le Noir, enregistrés en 1957, en A.O.F., en A.E.F., au Togo, au Cameroun et à Madagascar. [**Cancer Notifications in Africans of French West Africa, Equatorial Africa, Togo, Cameroons and Madagascar in 1957**] *Bull. Inst. Nat. Hyg.* Paris. 1960, Jan.-Feb., v. 15, No. 1, 1–11.

The cancer notifications among Negroes during 1957 in the various regions are given by age, sex and site. The numbers were 661 males and 363 females in West Africa; 334 males and 310 females in Equatorial Africa, Togo and Cameroons; 139 males and 194 females in Mada-gascar. In addition to these differences in the sex dis-tribution between the regions the distribution by sites also showed large differences. In West Africa 54% of the male cancer cases were due to primary cancer of the liver and in Equatorial Africa (with Togo and Camer-oons) and Madagascar the percentages were 18 and 4·3, respectively. Cancer of the uterus was responsible for 19% of the female cancers in West Africa, 23% in Equatorial Africa and 35·6% in Madagascar.

W. J. Martin

MISCELLANEOUS DISEASES

WILSON, R. H., MEADOR, R. S., JAY, B. E. & HIGGINS, E. **The Pulmonary Pathologic Physiology of Persons who Smoke Cigarettes.** *New England J. of Med.* 1960, May 12, v. 262, No. 19, 956–61, 3 figs. [19 refs.]

14 persons who had never smoked were paired for body surface, height, age and occupational background with 14 who had smoked 20 or more cigarettes daily for a mean of 18 years, persons with signs and symptoms of lung disease being excluded. The pulmonary function of each individual was measured in the laboratory. the smokers there was a significant decrease in insp tory capacity, total lung capacity, one-second for vital capacity, maximum breathing capacity, total p monary diffusing capacity and membrane diffusing ca city, and a significant increase in the index of pulmon mixing and the ratio of residual volume to total l capacity. The observations, therefore, add to the ex ing evidence that smoking damages pulmonary tiss and depresses physiological functions.

A. Bradford Hi

Sanitation

The order in this section is:—**General; Water and Swimming Baths; Sewage, Trade Waste and Refuse Disposal; Housing; Infestation; Atmospheric Pollution; Port, Ship and Aviation Hygiene.**

GENERAL

YAPP, W. B. [Edited by.] **The Effects of Pollution on Living Material.** Symposia Inst. Biol. No. 8. pp. xii + 154, illustrated. 1959. London: The Institute of Biology, 41, Queen's Gate, S.W.7. [25s.]

The Institute of Biology serves a most useful function in bringing together biologists from many fields, and in confronting the academic biologists with practical problems. Those of us in the field of environmental sanitation have reason to be thankful to the Institute, also, for reminding us of the very considerable contribution that the biologist can make to our work. The present volume is the report of the symposium held in September 1958 which reviewed recent research on the effects which pollution of air and water can have on plants and animals.

After a chapter on the general condition of rivers in Britain (pp. 1–10) by F. T. K. PENTELOW, H. B. N. HYNES writes on the biological effects of water pollution (pp. 11–24). In this chapter the author gives a useful introduction to the concept of the biological examination of a river water as a means of assessing its pollution—toxic, organic, suspended matter, heat, etc. D. F. WESTLAKE complements this with a discussion of the effects exerted by biological communities on polluted streams (pp. 25–31).

A. B. WHEATLAND (pp. 33–50) and A. L. H. GAMESON (pp. 51–59) give a useful survey of some of the research that has been going on for the last decade on the water of the Thames estuary. In particular they discuss some aspects of the carbon, nitrogen and sulphur cycles. This important investigation by the Water Pollution Research Laboratory, although still incomplete, has served to emphasize the complexity of the problem, which has almost defied the setting up of a mathematical model its solution.

In recent months much attention has been paid to pollution of our estuaries and coastal waters, some c tributions, at least, generating more heat than li G. E. NEWELL discusses the effect of pollution on abundance of animals in estuaries (pp. 61–69).

E. T. WILKINS writes on air pollution (pp. 71– without doubt the most damaging aspect of the envir ment in Britain. On the whole, biologists (as oppo to medical scientists) have been less concerned with pollution than with water pollution and Dr. Wilki chapter will serve as a useful introduction. One sm criticism may be offered here: Dr. Wilkins has quo the "maximum allowable concentration" as "appr mate toxic limit". The MAC values are drawn up a healthy subject for an exposure of a working s only and it is unsatisfactory to use these values in cussing the external, entirely uncontrolled, environm Nevertheless, it is surely cynical to suggest that "m mum allowable" and "threshold toxic" mean the sa thing. Another mistake commonly occurring is to the list of these MAC values as a kind of "leag table of toxicity values.

The effects of air pollution on plants and on man discussed by J. K. A. BLEASDALE (pp. 81–87) and F LAWTHER (pp. 89–93), and Ruth ALLCROFT writes fluorosis in farm animals (pp. 95–102).

The last four chapters by R. H. BURNS (103–112), J. M. BOWEN (113–123), W. L. TEMPLETON (pp. 125– and T. C. CARTER (pp. 141–150) give a synoptic view the effects of radioactive substances on plant and ani life.

This book can be highly recommended, and to any

concerned with controlling the environment will be most valuable and will provide much essential information. The list of references following each chapter will enable the reader to pursue any topic of particular interest.

If a reviewer may offer a small criticism, it is that the presentation of the volume is "amateur" in appearance. The typography is unattractive and the presswork poor. The general muddy appearance of the text may lead potential readers to underestimate the book's value.

Peter C. G. Isaac

WATER AND SWIMMING BATHS

(Including the Bacteriology of Water Supplies)

PETERSEN, N. J. & BORING, J. R. **A Study of Coliform Densities and *Escherichia coli* Serotypes in Two Mountain Streams.** *Amer. J. Hyg.* 1960, Mar., v. 71, No. 2, 134–40, 2 figs.

"It is not uncommon for small communities in the Rocky Mountain area to use untreated water from small, semi-isolated mountain streams as a public water supply". As these waters often give positive coliform tests a study was made of 2 of these streams.

There is here a detailed report of the adopted methods of survey, sampling and bacteriological investigation. 2 figures give diagrams of the areas studied. Tables with description set out the coliform densities and the *Escherichia coli* types found at the various sampling points in the 2 areas.

It is stated in the discussion that the magnitude of the study "was considerably less than desirable" but that its results may be of use to other studies.

Points in the summary are "Drainage from flood irrigation and the presence of cattle in a stream were found to affect the otherwise uniform coliform densities. The frequent occurrence of the same sero-types at various stations on the same day and on various days at the same station adds knowledge to the questions concerning source and survival of coliform organisms".

M. E. Delafield

CIUCĂ, M., MEITERT, T. & MEITERT, Eugenia. Contribution à l'étude des systèmes phagobactériens entériques isolés des eaux du lac de Tekirghiol. **[Phage-Enterobacterial Systems isolated from the Water of Lake Tekirghiol]** *Arch. Roumaines Path. Expér. et Microbiol.* 1960, Mar., v. 19, No. 1, 1–8, 1 fig.

The English summary appended to the paper is as follows:—

"Some biological aspects of enteric phages were studied, as displayed in the particular environmental conditions obtained in the Tekirghiol Lake (hypersalinity, abundant saprophytic microbial flora, presence of health resorts whose drainage systems are emptying into the lake, etc.). For this purpose, samples of lake water were collected at various times from 20 different sites. The investigations concerned: the presence of free bacteriophages in the water of Lake Tekirghiol, directly and after repeated enrichment, the spectrum of activity of these phages versus various strains of enterobacteriaceae, the microbial flora of an enteric nature in the samples of water collected, and the lysogenicity characters of the microbial strains isolated.

"Direct examination as well as testing after monovalent enrichment with various lysosensitive strains showed enteric bacteriophages to exist in the samples, especially multivalent coli phage acting upon colon bacilli as well as upon strains of dysenteric and typhoid bacilli. Such phages were present in greater numbers in points of maximal pollution of the lake (due to the presence of sewers), in contradistinction to their total absence in samples collected from the middle of the lake.

"In summer enteric bacteriophages were demonstrable upon simple direct examination (without enrichment), while at the beginning of the month of March (at the time when the snow was melting), in samples from the same sites bacteriophages could only be demonstrated after repeated enrichment.

"The spectrum of activity of the isolated phages was multivalent, especially in the case of coli phages.

"Among the microbial strains isolated, colon and paracolon bacilli were prevailing. In many cases they proved to contain endogenous phages possessing a multivalent lysogenic spectrum (against colon, dysenteric, and typhoid bacilli). On the whole, 73·68% of the investigated strains were lysogenic."

CHANG, S. L., WOODWARD, R. L. & KABLER, P. W. **Survey of Free-Living Nematodes and Amebas in Municipal Supplies.** *J. Amer. Water Works Ass.* 1960, May, v. 52, No. 5, 613–18.

"The persistent recurrence of free-living nematodes in a city water supply" which was reported in 1959 has led to a survey of a representative group of large city water supplies in the United States, to search for nematodes and also for viable cysts of free-living amoebae. Samples of raw and finished waters were obtained from 22 States and examined by methods which have been published. From a table of results it can be seen that of the 15 river supplies all but one contained live or dead nematodes in both the raw and finished waters. Half the supplies yielded more than 10 worms per gallon in the raw water. There is a detailed description and discussion of the findings.

"The nematodes present in these supplies were assigned to the genera *Aphelenchus, Cephalobus, Cheilobus, Diplogaster, Dorylaimus, Monhystera, Rhabditis* and *Turbatrix* (vinegar eel)" and 3 strains were isolated in pure culture.

"Eight supplies showed small numbers of viable cysts of free-living amebas of the *Naegleria* and *Hartmannella* genera in their finished water."

The possible sanitary significance of the findings in this survey is considered in some detail.

M. E. Delafield

DELUTY, J. **Synthetic Detergents in Well Water.** *Pub. Health Rep.* Wash. 1960, Jan., v. 75, No. 1, 75–7.

Synthetic detergents have appeared in well waters in Suffolk County, New York [this *Bulletin*, 1959, v. 34, 554], and on Rhode Island, in areas where there was no public water supply or sewerage system. The detergents arrive in the wells by leaching through the ground water, from septic tanks and absorption fields. Unlike soaps, synthetic detergents are not precipitated by calcium and magnesium ions in the soil or the septic tanks and are also resistant to biological action.

The Department of Health, Rhode Island, investigating complaints of tastes, odours and foaming of well waters, found that 56% of the samples received were coliform positive and 89% were grossly polluted as measured by chemical methods. Of the samples, 73% were from wells located within 50 ft. of a sewage disposal unit and 94% from wells within 100 ft. of a sewage disposal unit.

In 25 wells examined, 6 were bacteriologically contaminated but only 1 well was free from synthetic detergent. The presence of a high nitrate concentration in the well water suggests that oxidation of carbonaceous and nitrogenous pollutants from the septic tank effluent has taken place in the soil, but that the synthetic detergent molecule has resisted biological oxidation. The Rhode Island Department of Health recommended that the minimum size of lots in areas with no public water supply and sewerage systems should be 2 acres and that wells should be located over 100 ft. from any sewage disposal system.

D. Jenkins

RYZOV, N. V. & ŠTANNIKOV, E. V. Dezinfekce vody infikované virem poliomyelitis. [**Disinfection of Water infected with Poliomyelitis Virus**] *Československ. Hyg.* Prague. 1960, v. 5, No. 5, 279–83. [17 refs.]

The English summary appended to the paper is as follows:—

"The authors made 60 experiments on 720 albino mice, the purpose of which was to work out a method of disinfection of water infected with poliomyelitis virus. The mice were inoculated intracerebrally with water infected with pure poliomyelitis virus type 2 Lansing, which was disinfected with the tested preparation. The survival of the animals indicated the efficacy of the preparation. Simultaneously control experiments were made.

"From the experiments the following conclusions be drawn:—

"1. Chlorination of water, containing poliomyel virus, with gaseous chlorine for 30 mins. maintain the residual chlorine at a level of 0·5–2·1 mg./l., an effective method of disinfection. Reducing the per of contact to 15–20 mins. interferes with the efficacy disinfection.

"2. Preparations containing chlorine (pantocid di phate pantocid) and iodine are able to destroy the vi of poliomyelitis when containing 1·5–2·1 mg./l. residual chlorine (iodine) in the water; the time of c tact must be 30 mins., the *p*H of the water 7·0–7·3, temperature 16–18°.

"3. Filtration of the water containing the virus o carboferrogel at a rate of 5–6 m./hour, which is usual rate in water stations also removes these ge from the water."

BERGER, B. B. **Public Health Aspects of Water Re for Potable Supply.** *J. Amer. Water Works A* 1960, May, v. 52, No. 5, 599–606. [21 refs.]

This is a paper presented in 1959 at a joint sectio meeting of the American Water Works Association. it there is some account of recent experience in United States of direct re-use or "recycling" of water from treated municipal sewage. Although wa re-use can be expected to increase because of the gro of population and industry where there is fixed wa supply, there is need for more knowledge and conside tion of "new concepts of water quality managemen The factors which are "pertinent to the question water reuse and public health" are considered under headings of physical quality, bacterial pathogens, fun pathogens, enteric viruses, parasitic protozoa, paras worms, infectious disease and pollution by undesira chemicals of various kinds.

The main conclusions are "A combination of curr sewage and water treatment processes should, therefo not be considered adequate to convert sewage to s drinking water. Total recovery of the pure water municipal sewage will require a much better und standing of the microbial and chemical challen involved. Expanded research on advanced water-cle sing processes is necessary."

M. E. Delafiel

PARVIS, D., CAROLI, G. & BARBUTI, S. Ricerche sull' quinamento microbico della fascia marina costi della città di Bari. [**Investigation of the Bacter Contamination of the Shores of the City of Ba** *Nuovi Ann. d'Igiene e Microbiol.* 1960, Jan.–Fe v. 11, No. 1, 21–32, 1 fig. [29 refs.] English su mary (8 lines).

The city has a population of rather over 300,000 a the authors mention that the sewerage system is to radically reconstructed. At present it is nominally the 2-pipe system but over the years the rain wa drainage has become used for sewage also. The to daily amount of sewage discharged is about 30,000 cu [=approximately 20 gallons per head per day] which

discharged into the sea without any preliminary treatment through several outfalls, the greatest collection of these being round the old and new harbours, though the main outfall is some distance to the east of the heavily populated parts. The main tidal currents run from east to west and 1 of the 2 Lidos is situated not far to the west of the main outfall.

In 1958–59 the authors attempted to ascertain the extent of bacterial contamination of the sea at various sites on the city's shores and at varying distances from the beach. Samples were taken from 11 sampling points at distances from the shore varying from 1 m. to 1 km. at different seasons but avoiding periods of storms or heavy rain.

The samples were tested for (a) total count—on nutrient agar; (b) coliforms—on Neri's phenol red-lactose medium; (c) anti-typhoid and anti-coli phage, with 13 strains of *Salmonella typhi* and 1 strain without Vi, and 3 strains of *Escherichia coli;* (d) NH_3 and nitrites.

In general the lowest counts were found towards the far west of the city and the highest near the sewer outfalls, the main outfall showing very high figures. Even at 750 m. from the beach the extent of contamination was very considerable, and at the Lido near the main outfall at 750 m., the count was over 180 per ml. Coliforms were found in amounts of sea water of 1 ml. or less at 4 sampling sites even 1 km. from the shore, one being again the previously mentioned Lido. Typhoid and coli phages were also found at 1 km. from this Lido and also at 4 other points at 750 m. The NH_3 and NO_2 figures showed on the whole the same trend. The Lido to the west of the city gave much better results, no coliforms or phages being found beyond 10 m. from the beach.

The authors point out that investigations made at other cities including Venice, Palermo, and the Rome Lido have not shown such a high degree of bacterial contamination of the sea water, and mention the high incidence of enteric fever and poliomyelitis in Bari [among the very highest in Italy] and then refer to the standards suggested by the American Public Health Association for bathing (3–4 coliforms per 100 ml.).

[This report is of special interest at the present time for Great Britain in view of the discussion on the memorandum of the Committee of The Medical Research Council (this *Bulletin,* 1960, v. 35, 635).]

W. K. Dunscombe

SEWAGE, TRADE WASTE AND REFUSE DISPOSAL

MINISTRY OF HOUSING & LOCAL GOVERNMENT. **Final Report of the Trade Effluents Sub-Committee of the Central Advisory Water Committee** [ARMER, F., Chairman]. pp. iv + 52. 1960. London: H.M. Stationery Office. [3s. 6d.]

Discharges to Rivers

The Armer Committee recommends that River Board's consent should be required for old as well as for new discharges. The River Boards should be able to impose standards for each discharge and should have the power to review each case from time to time. If such legislation was passed, then the dischargers should make, within one year, an application to discharge, the form of which application should be laid down by regulation. Failure to make such an application should result in the loss of protection from proceedings by the River Board. Non-compliance with the conditions laid down by the River Board would be an offence, but compliance would render a discharge immune from proceedings under the Salmon and Fresh Water Fisheries Act, 1923, under the Act of 1951, and under sea fisheries byelaws relating to pollution. The discharger would have the right of appeal to the Minister of Housing and Local Government.

Discharges of Trade Effluents to Sewers

The duty of Local Authorities to receive trade effluent into their sewers must continue to be determined (as under the 1937 Act) by local circumstances. The Local Authorities can, however, waive prescriptive rights, by appeal to the Minister, except if they are under contract with the trader. The volume and nature of a trade effluent should be known by the Local Authority who should have the right to install measuring equipment.

Farm effluents should be dealt with as trade effluents and the Minister should have the power to declare by an order that any class of effluent is a trade effluent.

The Committee recommended that a closer relationship should exist between Industry and the River Boards, and that when the constitution of River Boards comes under review the claims of industry to representation should be recognized.

Common Law

No change is recommended in the principal conclusions and recommendations, but two members of the committee have submitted in a reservation that riparian owners should only be able to apply for an injunction if a discharge was below the required River Board standard and not, as at present, on a standard of purity. Damage to a riparian owner must be proven and if so, can be recovered whether the damaging discharge complies to a standard or not. *D. Jenkins*

FOSTER, R. F. **The Need for Biological Monitoring of Radioactive Waste Streams.** *Sewage & Indust. Wastes.* Wash. 1959, Dec., v. 31, No. 12, 1409–15. [21 refs.]

In a discussion the author stresses the fact that in assessing the exposure which man receives from an environment containing radio-active wastes, consideration must be given to all the sources which contribute

to the total exposure. Maximum permissible concentrations for water have been derived from the limits recommended by the National Committee on Radiation Protection and Measurement (*Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water*, Washington, D.C., 1953, U.S. Dept. Commerce, National Bureau Standards Handbook 52) and are only guides to be used in one facet of evaluating exposure.

Certain isotopes, ^{32}P is cited, can be concentrated by stream flora and fauna, and these sources of exposure must therefore be included in any monitoring programme designed to assess the total exposure to man.

D. Jenkins

ZOŁACZKOWSKI, S., KOWALCZYK, J. & ŻUKOWSKI, Z. Chlorowanie ścieków w sanatoriach przeciwgruzliczych Cz. I. Zależnośc przeżywalności prątków od stężenia chloru i czasu jego działania. [**Disinfection with Chlorine of Sewage Polluted by Tubercle Bacilli. I.**] *Acta Microbiologica Po nica.* 1959, v. 8, Nos. 1/2, 181–4, 1 fig. [15 re

The English summary appended to the paper is follows:—

"In order to find the minimal suitable concentrat of chlorine and minimal time of exposure of ba needed for disinfection of sewage some laborat experiments were conducted.

"Survival of tubercle bacilli in sewage in relation concentration of chlorine and time of its action is i strated by fig. 1.

"It was shown that there is a quantitative relat between the effectiveness and concentration and time exposure. In the range of concentrations 20–80 m CL_2 and of time exposure 15–60 minutes, this relat could be written as a formula: $t \cdot c - 1200 \geqslant 0$, wh t – time of exposure in minutes, c – concentration chlorine in mg per litre.

"When product $t \cdot c$ is greater than 1200 there practically no survival of bacilli."

Occupational Hygiene

The order in this section is:—**General; Occupational Physiology; Occupational Diseases (Dust Diseases, Poisoning, Skin Diseases, Others); Occupational Psychology; Heating, Lighting and Ventilation.**

GENERAL

LUVONI, R. La prevenzione delle malattie professionali nell'industria secondo la vigente legislazione. [**The Prevention of Industrial Diseases according to the Laws in Force**] *Rass. Med. Indust.* Turin. 1960, Jan.–Feb., v. 29, No. 1, 1–76. [Refs. in footnotes.]

The author has collected and commented on the latest laws concerning the prevention of industrial diseases in Italy.

BENDER & LAMY. Essai sur la pathologie du travail en chaudronnerie. [**Study of Occupational Disease in a Boiler Works.**] *Arch. Malad. Professionelles.* Paris. 1960, Mar., v. 21, No. 3, 158–64.

This paper reports the results of an investigation of the noise problem in a boilermaking shop employing 329 persons. The workshop, which was 170 metres long and 55 metres wide with a ceiling height of 10 metres, contained heavy metal presses and large automatic welding machines. The employees in the workshop were being exposed to welding fumes, noise and vibration. Measurement of the noise levels indicated the maximum intensity to be 108 db with peaks of 90 to 94 db at the frequency ranges of 750, 2000 and 4000 cycles per second.

Audiometric tests were carried out on 307 employe who were divided into 5 groups, according to their occ pational status as follows: 116 coppersmiths, 82 welde 10 blacksmiths, 53 metal press operators and 64 misc laneous [these add up to 325]. A classification of t exposed persons was also made according to length exposure to noise, *viz*, 0–2 years, 2–5 years, 6–10 yea 11–20 years, 21–30 years and over 30 years. Altogeth 480 persons were tested, this number including a cont group of 118 subjects, 19 employees with known e disease, 16 who left the noisy environment and results which were rejected for various reasons. T audiometric tests were conducted after the exposed pe sons had been out of the noisy workshop for at least hours. It was found that 93% of these employees h a permanent loss of hearing and 29% had developed degree of deafness which was socially embarrassi Some observations are made, from the results of a mo detailed study of certain employees, on the alleged pr tective effect of chronic middle ear disease, and on t possibility of recovery of auditory function following change of employment after many years' exposure noise.

The authors also conducted a survey of the gene health of the employees in the workshop, and in enu erating their results from this study, they refer them the results of a comparable survey in quiet worksho

but without mentioning any details from the latter survey. They ascertained that 95% of persons exposed to noise were untroubled by it; the remaining 5% complained of symptoms a proportion of which, particularly the psychological and digestive, could have some direct relationship to noise.

There is general discussion at the end of the paper on preventive measures, but the most interesting part of this communication is that which discusses the audiometric results. Interested readers should refer to the original for full details of the latter.

P. J. R. Challen

BITTERSOHL, G. Ergebnisse von Röntgenuntersuchungen an Knochen und Gelenken bei Pressluftwerkzeugarbeitern. [**Findings of X-ray Examination of the Bones and Joints of Workers with Pneumatic Tools**] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1960, v. 17, No. 6, 597–617. [31 refs.]

A discussion of the literature on the nature and mechanism of causation of damage to the bones and joints of workers with pneumatic tools introduces the findings of routine X-ray examinations carried out on 486 such workers. These workers were (1) boiler makers and steel workers, (2) building workers and (3) miners. Particulars are given of the different types of pneumatic tool used by these groups of workers, the age distribution of these men, the number of years of their employment and the daily hours of work. X-ray examination was restricted to the hand, elbow and shoulder joints. The findings in pneumatic tool workers were compared with those in a control group of men. There is a long description and discussion of the results, which were somewhat complicated.

The main conclusion is that in 13% of the workers there was evidence of damage caused by the use of pneumatic tools. Of this percentage 10·9% were osteomalacia of the semilunar bone and 0·4% of pseudarthrosis of the navicular. Among the boiler and steel workers and the building workers damage to the elbow joint was common whereas in miners the damage was almost entirely restricted to the small bones of the hand in the form of cyst formation. *M. E. Delafield*

LANE, R. E. & DINGWALL-FORDYCE, Ianthe. **Oxygen or Carbogen in First Aid Resuscitation in Industry.** *Trans. Ass. Indust. Med. Officers.* 1960, Apr., v. 10, No. 1, 26–8. [11 refs.]

In an attempt to give some guidance to industrial medical officers left in some doubt by recent events, Professor R. E. Lane, Nuffield Department of Occupational Health, University of Manchester, considers the comparative frequency rate of carbon monoxide poisoning in industry. Since 1952 the first aid practice of administering carbon dioxide and oxygen, Carbogen, to cases of asphyxia gradually changed as a result of the Medical Research Council recommendation that oxygen alone should be used for first aid to all apnoeic patients. In 1955 this was published, and the advice was challenged for carbon monoxide poisoning. Experiments showed that 5% CO_2 in O_2 leads to more rapid elimination of CO than does O_2 and that this was related to the greater volume of ventilation, with earlier recovery. In 1958 the Medical Research Council amended their recommendation for CO poisoning only. The doctor in industry has a problem in deciding which equipment to provide for his first aid teams.

Tables present violent deaths involving anoxia in England and Wales, accidental deaths involving anoxia at places of work, estimations of the much larger number of non-fatal accidents requiring resuscitation at work, 1955–57, and notified fatal cases at work, 1947–58.

Carbon monoxide caused 52% of the country's violent deaths (mostly suicides), but at work only 14%. Of the non-fatal work accidents (excluding drowning) about 50% were caused by CO. The mean fatality rate at work from CO in 1947–52 was 11·1%. This was slightly, though not significantly, exceeded in 5 of the 6 years after 1952 (mean 11·9%). However, the percentage of CO in town gas tended to increase during the latter period.

If in his works there is a CO hazard, the industrial medical officer should make special provision for the use of CO_2 and O_2, but for resuscitation generally, and especially where there may be no indication of the cause of anoxic collapse, he would be wiser to provide oxygen.

M. Patricia Fitzsimons

TUBICH, G. E., DAVIS, I. H. & BLOOMFIELD, B. D. **Occupational Health Studies of the Shell-Molding Process.** *Arch. Indust. Health.* Chicago. 1960, May, v. 21, No. 5, 424–44, 13 figs. [11 refs.]

An address to the American Conference of Governmental Industrial Hygienists begins with a description of this process, said to be the first major change in foundry practice principles since the Bronze Age. It was developed in Germany by CRONING during World War II. There are 3 major differences from conventional sand-casting techniques: the metal shell-mould pattern is heated and needs ejection pins for removal of the mould; the moulding material is a phenolic-resin-sand-mixture, formed by dry blending or hot or cold coating; and the moulds are cured in an oven where polymerization is completed. Silicone or wax parting compounds are sprayed on the heated pattern in the shell-moulding machines to which the resin-sand mixture is transferred by the investing or blowing techniques. Chemical additives are used sometimes to improve mould surfaces. Mould halves may be produced from the same pattern, containing cope and drag, and can be broken apart. Various techniques are described for assembling mould sections.

Extensive environmental studies in 7 foundries producing ferrous castings are illustrated by photographs of blending and hot coating, moulding, mould sections, mould glueing and pouring and by designs for ventilation improvement. Silica content of moulding materials and dust and particle size were similar to those found in

conventional foundry operations. 45% of dust concentrations exceeded 20,000,000 particles per cu. ft. of air. There is a potential explosion hazard during sand conditioning with alcohol-resin mixtures and from dust accumulation. CO is present during pouring and shake-out operations. There were no health hazards from phenols, aldehydes and ammonia. Dermatitis has b caused by the resin.

Recommendations for controlling dust and sol exposure include exhaust, good housekeeping and ch of the safer organic solvents as diluents for the silic parting compounds. *M. Patricia Fitzsimo*

OCCUPATIONAL PHYSIOLOGY

HASSELT: INSTITUT D'HYGIÈNE DES MINES. Communication hors-série. Réactions physiologiques aux divers climats [**Physiological Reactions to Various Climates**] [LAVENNE, F.]. Conférences présentées au Congrès International de Chauffage et Climatisation, Brussels, 1958, pp. I–1—I–16, 7 figs. (35 refs.).]

In the first part of this paper some of the more important aspects of heat physiology are reviewed very briefly, and in the second part the effects of extreme climates on man are considered.

In connexion with cold climates the importance of suitable clothing is emphasized, and reference is made to the " Clo " unit of thermal insulation.

Indices of warmth are discussed, and it is concluded that the heat-stress index of BELDING and HATCH [this *Bulletin*, 1956, v. 31, 307] represents a distinct advance on indices proposed earlier. The results of various investigations are mentioned to show that in excessive heat industrial production declines and the frequency of accidents increases. Brief reference is made to the possible effects of heat on the health of industrial workers, and finally the ideal thermal conditions for various types of work are summarized. *Thomas Bedford*

HASSELT: INSTITUT D'HYGIÈNE DES MINES. Communication hors-série. La température de la peau dans les climats-limite [**Skin Temperature in Limit Climates**] [LEYH, P.]. [Conférences présentées an Congrès International de Chauffage et Climatisation, Brussels, 1958, pp. II–1—II–9.]

The paper reports measurements of skin temperature made on 18 working subjects, stripped to the waist and wearing rescue apparatus, whose heat production was about 200 kcal. sq.m. hour. The subjects were exposed to 3 different environments. They spent 2 hours in an environment at 43·2°C. (109·8°F.) dry bulb and 30·5°C. (86·9°F.) wet bulb; 1 hour and 10 minutes at 46·2 (115·2°F.) dry bulb and 35·5°C. (95·9°F.) wet bulb, 1 hour at 47·8°C. (118·0°F.) dry bulb and 37·2 (99·0°F.) wet bulb.

Skin temperatures on 5 sites and rectal temperat were measured at the beginning and end of work an the middle of the period of work.

The rectal temperatures before work averaged 37·2 (99·0°F.), 37·4°C. (99·3°F.) and 37·3°C. (99·1°F.) in th environments respectively, and the corresponding t peratures at the end of work were 38·4°C. (101·1° 39·5°C. (103·1°F.) and 39·5°C. (103·1°F.).

The mean skin temperatures before work avera 34·27°C. (93·7°F.), 34·39°C. (93·9°F.), and 34·36 (93·8°F.), and those after work averaged 36·0 (96·8°F.), 38·15°C. (100·7°F.) and 38·61°C. (101·5°

The excess of the rectal temperature over the m skin temperature before work averaged 2·93°C. (5·3° 3·01°C. (5·4°F.), and 2·94°C. (5·3°F.), whereas the ex after work averaged 2·4°C. (4·3°F.), 1·35°C. (2·4°F.), 0·89°C. (1·6°F.).

While the men were at rest their mean skin temp tures were substantially lower than their rectal temp tures, even in the hottest conditions. During work skin temperature rose much more than did the re temperature, but even in the hottest conditions skin temperature did not rise as high as the re temperature.

In the calculation of the BELDING and HATCH index heat stress [this *Bulletin*, 1956, v. 31, 307] the mean s temperature is assumed to be 95°F. The observati reported in the present paper show that when the m were working in extreme heat their skin temperat were distinctly above 95°F. This indicates that the culation based on that temperature gives a considera margin of safety, and the author remarks that a calc tion based on an assumed skin temperature of 37 (98·6°F.) would more exactly represent the toler limits. *Thomas Bedfor*

OCCUPATIONAL DISEASES

MERCER, T. T., MILLS, C. M. & GIBB, A. R. **Collection Efficiencies of a Cascade Filtration Device employing Wire Gauzes.** *Ann. Occup. Hyg.* London. 1960 Apr., v. 1, No. 4, 301–13, 8 figs.

This very useful paper describes the evaluation of the performance of a cascade filter which is designed for sampling aerosols and determining their m distribution.

The device has three stages: (1) a 325-mesh screen; (2) a tightly-woven wire gauze; and (3) a m pore filter, but the efficiency of (3) is not discussed. gross efficiencies of the first two stages were measu by using NaCl and UO_2 aerosols collected at 3 f

rates. NaCl was estimated by washing the filters and chemical analysis, UO_2 by scintillation counter. The results are interpreted in terms of DAVIES'S inertial parameter P (*Proc. Roy. Soc.* Ser. A., 1956, v. 234, 269), and show that the stage 2 filter increases in efficiency E very rapidly as P_m, the value of P for particles of the mass median diameter, increases. Over a wide range of P, however, E for each stage is fairly constant, so that the device is unsuited for determining mass distribution. Nevertheless over a wide range of P_m, E for stage 1 gave a straight line when plotted against the logarithm of $\sqrt{P_m}$. This suggested that for this stage E might be expressed in terms of the logarithm of $\sqrt{P}$, and an equation is given. From it E is estimated as a function of particle size for NaCl and UO_2.

For stage 2 an empirical expression for E in terms of $\sqrt{P}$ is suggested.

The results are discussed very briefly, and the authors conclude that a device such as this requires at least three stages, each with an efficiency curve similar in shape to that of stage 2 but displaced relatively to one another with respect to $\sqrt{P}$, if it is to be suitable for determining mass distribution.

The derivation of the constants in the expressions for E is given in two appendices. *J. McK. Ellison*

OLAF, J. Korngrössenanalyse unter Verwendung des Spaltultramikroscops. [**Particle Size Analysis with the Slit Ultramicroscope**] *Staub.* Düsseldorf. 1960, June 1, v. 20, No. 6, 180–83, 5 figs. [16 refs.]

The counting of aerosol particles with the slit ultramicroscope is inaccurate for two reasons; firstly the illuminated volume within which particles are counted is difficult to define, and secondly the amount of light scattered by small particles is so much less than that originating from large ones that it is difficult to arrive at a suitable compromise for the intensity of illumination.

The apparatus described in this paper uses comparative counts of the same field, over a succession of time intervals during which the larger particles disappear by sedimentation, so that the above two errors are minimized and a size distribution, not an absolute particle count, is obtained.

An intense horizontal illuminating beam is used with a lens forming an image of a horizontal slit in the observation chamber. This is viewed vertically and photographed at intervals over half an hour, the illuminated zone measuring, in plan, 0·5 x 6 mm. and being magnified 6 times on the photographic film. The negative after development is enlarged a further 10 times and counted by projection.

The dust is drawn into the observation chamber which must be free from convection currents during the period over which photographs are being taken; it is possible that the rather large scatter in the counts was due to insufficient attention to this point which is not mentioned. The advantage of the method is that the particles are always in the original airborne state. High-sensitivity photographic material is necessary and a good processing technique.

This work was supported by the High Authority of the European Coal and Steel Community.

C. N. Davies

HASENCLEVER, D. & SIEGMANN, H. C. Neue Methode der Staubmessung mittels Kleinionenanlagerung. [**A New Method of Measuring Dust by Means of an Ionization Chamber**] *Staub.* Düsseldorf. 1960, July 1, v. 20, No. 7, 212–18, 12 figs. [14 refs.]

HODKINSON, J. R. **The Relation between Ventilation Airspeed and Respirable Airborne-Dust Concentration in Coalmines.** Reprinted from *Colliery Engineering.* 1960, June, 236–9, 3 figs. [13 refs.]

While increasing the ventilation in coalmines normally tends to reduce the average concentration of airborne dust by dilution, a danger arises from the use of too high velocities that dust which is lying around on surfaces may be redispersed. This paper describes laboratory experiments which were carried out to check earlier suggestions that the optimal ventilation air speed was 200–300 ft. per minute.

Dust was spread in a concrete wind tunnel with a 1 ft. square cross section. The air stream was turbulent and the dust concentrations were measured by counting thermal precipitator samples in the range of particle size between 1 and 5 microns; filter paper stain measurements supplemented the counts.

Flat deposits of dust ½ inch thick on the floor of the tunnel, measuring 3 ft. downwind and faired with a wooden strip at the leading edge, were not disturbed until the air speed rose to 900 ft. per minute and the resulting dust concentration downwind was still low at 1400 ft. per minute. Heaped deposits were more readily dispersed but velocities exceeding 750 ft. per minute were required.

If the flat deposit was subjected to light periodic blows from wooden blocks the contrary effects of increasing dilution and increasing pick-up as the air velocity rose were clearly demonstrated and the airborne concentration was minimal in the range 250–900 ft. per minute. Increased turbulence in the air flow past the deposit had little effect.

The amount of dust picked up from a cascade of coal dust falling from a slot in the roof of the wind tunnel across the air stream and into a deep well containing water was also measured. A clear minimum of airborne concentration was found at a wind speed of 300–400 ft. per minute.

The mechanism of dust-dispersal is discussed and it is concluded that air speeds in excess of 1000 ft. per minute are needed to generate appreciable concentrations of airborne dust from undisturbed deposits. When the deposit is subjected to mechanical disturbance an optimum ventilation speed of 300–400 ft. per minute is indicated. *C. N. Davies*

CENTRAL MINING—RAND MINES GROUP. HEALTH DEPT. **Report for the Year 1959** [COETZEE, A. M., Chief Medical Officer]. 24 pp., 2 folding charts. 1960. Johannesburg.

SANO, T. & OSANAI, H. **Types of Pneumoconiosis and their Pathogenesis.** *Rep. Inst. Sci. of Labour.* Tokyo. 1959, Dec., No. 55, 27–36, 14 figs. [10 refs.]

The article written in English states that neither the authors nor any other research workers in Japan had, up to 1950, made any autopsy studies of pneumoconiosis other than silicosis. The present article makes good the deficiency and confirms that in Japan besides classical silicosis there occurs modified silicosis of various types and also asbestosis. Other forms of pneumoconiosis encountered include those caused by metallic aluminium, alumina, iron oxide, pyrophyllite, diatomite and graphite. Focal emphysema was more conspicuous in these than in classical silicosis. From animal experiments and the autopsy studies 3 categories of mineral dust pneumoconiosis are distinguished. In Type 1, as found with free silica, the fibrosis is predominantly interstitial in the lung and especially involves the pulmonary lymph nodes. In Type 2 the fibrosis is within the alveoli as found with metallic aluminium and alumina. Type 3 is also intra-alveolar as with asbestos and graphite but the lymph nodes are scarcely involved although massive fibrosis may develop in the lung.

The authors use the quaint but meaningful expression "unhappy pneumoconiosis". *J. Gough*

HIGGINS, I. T. T., COCHRANE, A. L., GILSON, J. C. & WOOD, C. H. **Population Studies of Chronic Respiratory Disease. A Comparison of Miners, Foundryworkers, and others in Staveley, Derbyshire.** *Brit. J. Indust. Med.* 1959, Oct., v. 16, No. 4, 255–68. [26 refs.]

Because mortality and morbidity statistics suggest that miners and foundry workers are more prone to bronchitis than other industrial workers, this investigation was undertaken to compare the prevalence of bronchitis and respiratory disability in a representative sample of miners, foundry workers and other industrial groups in a community. The town of Staveley, Derbyshire, with some 18,000 inhabitants was chosen as being suitable. A random sample of 850 men was aimed at, to be subdivided into two age-groups—25 to 34 years and 55 to 64 years—and 4 occupation groups—miners and ex-miners, foundry workers and ex-foundry workers, those in other dusty jobs, and those in non-dusty jobs, each of the 8 subgroups consisting of 100 men, except for the elderly miners and ex-miners, which was to be 150 to allow for a subdivision of these with and without pneumoconiosis. In the event the total sample comprised only 756 men. Men in the samples were allocated randomly to two doctors who used a standardized questionnaire for recording respiratory symptoms and who estimated the ventilatory capacity by means of the forced expiratory volume ($FEV_{0.75}$) and recorded this as the indirect breathing capacity (MBC). There was no clinical examination but a postero-anterior chest radiograph was taken.

Miners and ex-miners had a higher prevalence of respiratory symptoms and a lower mean MBC than men in non-dusty occupations. The differences were, however, only statistically significant in the younger group, and the authors state that in Staveley (in con to findings elsewhere) the elderly miners and ex-m were not strikingly different from men who had n worked in dusty occupations. However, with increa number of years spent on the coal-getting shift there an increased prevalence of breathlessness accompa by a reciprocal fall in the mean MBC. In neither group did miners with simple pneumoconiosis ap materially different from those with no pneumoconi Foundry workers and ex-foundry workers with a industrial history recorded a similar prevalence of sy toms to men in the non-dusty group, and their n MBC was only slightly and insignificantly lower. Sy toms were however more frequent, and MBC lowe foundrymen who had been exposed to other dusts fumes.

The only subgroup of foundry workers sufficie large for analysis was moulders, in whom there wa suggestion of any undue liability to respiratory sy toms or bronchitis. Analysis of men employed in cellaneous dusty trades pointed to an undue incidenc chemical workers, a subject which seems to merit fur study.

There was a considerable increase in the preval of symptoms and diminution of mean MBC among c men in all occupational groups, and a similar mar difference was found among tobacco smokers comp with non-smokers, this being more marked amo heavy smokers. The authors found the freedom f symptoms of elderly non-smokers rather striking. wives of elderly men who worked in dusty jobs ha somewhat higher prevalence of cough or sputum or l and chest illness than did the wives of men who worked only in non-dusty jobs. Comparison of results obtained in connexion with men not exposed occupational dust in Staveley and Leigh (another in trial town with high air-pollution) [this *Bulletin,* 1 v. 32, 50] and two rural localities were rather in clusive. *A. T. Doig*

GROSS, P. **Chronic Interstitial Pneumonitis. Histogenetic Study.** *Arch. Pathology.* 1960, J v. 69, No. 6, 706–15, 6 figs.

This is a study of alveolar wall changes in ani and man in conditions covered by the term chr interstitial pneumonitis. The animals employed 240 guineapigs which were given intratracheal inject of quartz dust contaminated with iron. Some of animals had additional injections of tuberculin, or li tubercle bacilli of low virulence, or such bacilli ki The human material came from cases of dust disease berylliosis (1), bauxite pneumoconiosis (1), Hamm Rich disease (1), tuberculous pneumonia (2), and i stitial pneumonitis of undetermined character (3). observations indicate that certain alveolar wall cha are common to all the conditions investigated. types of changes in the alveolar wall are found:- Expansive, where a space between the basement m branes of the capillary and the basement membran the alveolar surface becomes filled up; this type

change does not obliterate the alveoli: (2) more commonly the alveolar wall is thickened by the accretion of cells on the surface, and these become part of the wall; the alveoli themselves become obliterated and the alveolar ducts are converted into smooth-walled cylinders which on section may be mistaken for enlarged alveoli.

The human material did not provide lesions as early as that from animals. One case of asbestosis, one of berylliosis, and two cases of tuberculous pneumonia, however, had lesions corresponding to a prefibrotic stage. In these cases the alveolar walls were greatly thickened. The alveolar capillaries were very prominent in some of the human material, particularly in the case of asbestosis where in many parts a profusion of distended capillaries gave an appearance simulating an angioma. An interesting feature of the vascular arrangement, it is stated, is that not only are most of the capillaries excessively large and have a major portion of their circumference presenting to the alveolar lumen, but the free portions of the capillary circumference usually demonstrate no significant thickening of the wall which would constitute an alveolo-capillary barrier. *Charles L. Sutherland*

PARRAVICINI, C. & RAMPINI, G. F. La silico-tubercolosi in Valtellina in era preantibiotica ed in era antibiotica. [**Silicotuberculosis in Valtellina in the Pre-Antibiotic and Antibiotic Eras**] *Lotta c. la Tubercolosi.* 1959, Dec., v. 29, No. 12, 1752–67. [30 refs.]

The authors have investigated the cases of silicotuberculosis which have been recorded in the dispensaries of the provincial tuberculosis service in Sondrio during the two 6-year periods of 1939–1944 and of 1952–1957. The first group [covering the wartime period] comprises 63 patients, the second 145: the authors suggest reasons to explain why so few cases came to light during the earlier period.

In the later period, more of the patients were found in the older age-groups, and the more severe types of both tuberculous and silicotic changes were recorded in the older subjects. The findings are plotted and the resulting curves show some 25% of the cases recorded to have been in the age-group 45–55 years during 1952–57, while for the earlier series of 1939–44 the peak is lower, wider and less sharply marked, spread over the age range of 35–60 years. These changes of trend are explained on the basis of improved preventive measures.

In both groups the lesser tuberculous involvement was in those suffering from the earlier stages of silicosis, and the more advanced silicotic disease was generally associated with cavity formation, often bilateral, and with other advanced tuberculous changes.

An increasing number of cases of silicotuberculosis have been found associated with earlier silicotic changes and their prognosis is then proportionately more favourable. When associated with advanced silicotic changes, tuberculous infection may escape detection for some time and these patients often succumb to the disease in spite of all our present resources in antibiotic drugs. *J. Cauchi*

SAKABE, H., KOSHI, K., MATSUSHIMA, K. & SHIMA, I. **Studies on the Pathogenesis of Silicosis. Further Study on the Dissolution of Quartz Dust in Water.** *Bull. Nat. Inst. Indust. Health.* Kawasaki. 1958, No. 1, 3–13, 5 figs. [16 refs.]

Colloidal silicic acid and total silicic acid in solution were estimated by the blue silicomolybdic acid and alkali fusion methods respectively. In a first experiment the amounts of molecularly dispersed and colloidal silicic acid released from quartz particles in a buffer solution of *p*H 7·3 were measured. Polyethylene bottles were used for the suspensions to avoid contamination which might have occurred from the use of glassware. The suspensions of quartz particles (size below 200 mesh) were agitated in a water bath at 37°C. for 2 hours daily. After 7, 25 and 40 days, the suspensions were centrifuged at 3,000 r.p.m. for 30 minutes and allowed to stand for 24 hours until fine particles, whirled up into the supernatant, had been precipitated. Concentrations of molecularly dispersed and colloidal silicic acid were estimated. The amounts of both these acids were found to increase with time.

In a second experiment large quartz particles (approximately 150μ) were collected by water elutriation and suspended in buffer at several *p*H values from 5·18 to 9·1 to avoid the possible effect of the whirled-up fine particles after centrifugation. Each suspension of quartz of different *p*H was agitated at 37°C. for 2 hours daily for 7 days, centrifuged for 30 minutes at 5,000 r.p.m. and then left at room temperature for 24 hours. 3 separate aliquots of each supernatant were used to estimate molecularly dispersed, colloidal and total silicic acid concentrations. Control suspensions similarly prepared were shaken vigorously for one minute, centrifuged for 30 minutes at 5,000 r.p.m., and the concentrations of molecularly dispersed, colloidal and total silicic acid estimated. The results showed increased colloidal silicic acid concentration with increase in alkalinity and this acid was indeed only present at an alkaline *p*H.

In a third experiment the shape, size, and crystalline pattern of silicic acid released into the supernatant of a suspension of quartz particles (size under 200 mesh), allowed to stand at room temperature for 200 days with occasional shaking, was studied by electron microscopy. The particles of colloidal silicic acid were shown to be 0·01 to 0·3μ in size and some were flaky in shape. Electron diffraction showed them to have the crystalline pattern of quartz.

In a fourth experiment the solubility rates of quartz, tridymite, cristobalite and fused silica, as well as the amounts of colloidal silicic acid released from these silicas, were estimated. The results confirmed those of KING *et al.* [this *Bulletin*, 1953, v. 28, 435] and PATTERSON and WHEATLEY [*ibid.*, 1956, v. 31, 919] in that the solubility rates are similar and so do not correlate with the vastly different fibrogenicities of these different forms of silica. If the solubility theory of silicosis is still to be followed then a specific solution mechanism in tissue cells and evidence of modifications in colloidal size range of the different silicas must be looked for.

[See also this *Bulletin*, 1956, v. 31, 1112 *bis*; 1957, v. 32, 49.] *D. Rivers*

SAKABE, H., KOSHI, K., SHIMA, I. & MATSUSHIMA, K. **Studies on the Pathogenesis of Silicosis. Effect of Dissolved Silica on the Respiratory System of Cells.** *Bull. Nat. Inst. Indust. Health.* Kawasaki. 1958, No. 1, 14–25, 5 figs. [13 refs.]

In one series of experiments the authors investigated the effect of various quartz solutions on oxygen uptake of rat liver homogenates. The solutions differed in their content of molecularly dispersed and colloidal silicic acids and in their *p*H values. One of these solutions was prepared in phosphate buffer and another in borate buffer. The effects of suspended quartz particles and powdered quartz were also investigated. None of the solutions influenced oxygen uptake of liver homogenates but powdered quartz caused slight inhibition.

TiO_2, ZnO, and silica gel powder were similarly tested and were found to cause greater inhibition of oxygen uptake by the liver homogenates than the quartz powder.

Quartz irradiated at 40 KV and 2 mA and given a dose of 4,000 to 20,000 r appeared to have no effect on oxygen uptake.

In a second series of experiments the authors investigated the possible replacement of phosphoric acid in the diphosphopyridine nucleotide (DPN) molecule by silicic acid. Quartz solution was added to a solution of DPN and the absorption curve of DPN was estimated by spectrophotometery. No effect was observed by the silicic acid when compared with controls.

The activity of the dehydrogenase system was studied by using DPN as coenzyme. Powdered alcohol dehydrogenase was dissolved in phosphate buffer solution containing glycine, 5% ethyl alcohol was used as substrate, and DPN was added as coenzyme. The different quartz solutions (from the first series of experiments) were added to this system and the amounts of DPNH produced from DPN were estimated. A marked decrease in production of DPNH occurred only with the two quartz solutions which had been buffered in phosphate and borate respectively. In control experiments with these buffer solutions alone, *i.e.* free from quartz, DPNH production was also markedly decreased. In another experiment the activity of dehydrogenase was measured by reduction of methylene blue. The time for reduction of the dye increased proportionally with the amount of quartz added.

No effect of quartz on diaphorase activity was observed.

In a final experiment a quartz solution was added to methylene blue and the alcohol dehydrogenase activity was measured by the time taken to decolorize the methylene blue. Reduction of dye with the sample of dissolved quartz took twice the time for reduction with distilled water. *D. Rivers*

ENGELBRECHT, F. M. & PAUL, Rachel. **Enzymes in the Development of Silicotic Fibrosis in the Lungs of Rats.** *Ann. Occup. Hyg.* London. 1959, Apr., v. 1, No. 2, 135–48, 20 figs. (15 on 9 pls.) [35 refs.]

Experiments were performed to investigate the relation of the various stages of development of the silicotic nodule to enzyme activity in the lungs of the rat intratracheal injection of tridymite. 36 rats were di into 3 equal groups of 12 to provide 2 experim groups and one control group. Each rat in the ex mental groups received 25 mgm. tridymite suspend 1 ml. normal saline. Individual animals from all gr were killed 0, 24 and 48 hours and 4, 7, 21, 28, 4 and 70 days after injection. The lungs of one ex mental group were studied by histochemical techni for the detection of alkaline phosphatase, acid phos tase, non-specific esterase and sulphatase as well as h logically by haematoxylin and eosin staining and s impregnation. The lungs from the other experim group were used for the estimation of these enzyme chemical methods. (Details of the histochemical chemical methods are given.)

During the histological stage of acute inflamm lasting up to 4 days after injection there was a ma increase of alkaline phosphatase as demonstrated by the histochemical and chemical methods. Aft days the increase in reticulin and collagen in the le was accompanied by a steady decrease of this enzym normal levels. From 7 days after injection acid p phatase was seen to increase in the histological sect it disappeared in the collagenous areas but persiste the periphery of the lesions. The chemical estima showed a steady increase in acid phosphatase thro out the development of the nodules. Sulphatase increased from 7 days in the histological sections was seen in the macrophages but decreased in the c genous areas: again the chemical estimates show steady increase of the enzyme throughout. Non-spe esterase was seen to increase steadily up to 4 days thereafter to decrease steadily: the chemical me gave extremely variable results from animal to ani It is suggested that the marked increase in alkaline p phatase during the acute inflammatory phase may a a trigger mechanism for fibrogenesis. This enzyme n be related to an uncoupling of the oxidative phosph lation process in the mitochondria of the cells contai silica. The estimation of organic and inorganic p phate in control and silicotic tissues might be of valu future studies. On the whole the results of these ex ments showed a good correspondence between enzyme and cellular changes but no obvious relatio these changes to the deposition of collagen. *D. Rive*

GAULTIER, M., GUYOTJEANNIN, C., FOURNIER, E GUYOTJEANNIN, N. Recherche des anticorps séri anti-γ-globuline par "hémagglutination pass dans la silicose humaine. [**Detection of Se Anti-gamma-globulin Antibodies in Silicosis "Passive Haemagglutination"**] *Arch. Ma Professionnelles.* Paris. 1960, Mar., v. 21, N 150–57.

The authors have used the method of "pa haemagglutination" proposed by BOYDEN [this *Bull* 1951, v. 26, 562] to test for antibodies against ga globulin in human silicosis. Sheep red cells treated tannic acid are sensitized by gamma globulin and i bated with serial dilutions from 1:6 to 1:3,200 of serum to be tested. Agglutination indicates a pos

result. In 39 cases of silicosis anti-gamma-globulin antibodies were present in 11; in 9 cases of silico-tuberculosis 1 was found to be positive; in 11 subjects exposed to dust but without demonstrable silicosis 1 was positive. There appeared to be no relationship between a positive result and the stage or speed of evolution of the disease.

I. T. T. Higgins

VALIC, F., ABDEL SALAM, M. S. & EL-DAKHAKHNY, A. A. **A Study of Foundry Dust Exposures.** *J. Egyptian Pub. Health Ass.* 1959, v. 34, No. 6, 161–74, 1 fig.

In a foundry in Egypt employing 180 workers, where no dust-control measures are applied, the conditions were investigated by determinations of particle concentrations by count and by weight in various parts of the plant. In 5 representative samples of dust the free silica content by weight and its distribution in different particle sizes by count was measured. Average dust concentrations of over 50 million particles per cu. ft. were found in 6 out of 9 processes, which is the threshold limit value for dust with low silica content (*i.e.* below 5% free silica) of the American Conference of Governmental Industrial Hygienists in 1959. But all the dust samples contain a significant up to rather high content of silica so that the risk is considerable. No medical examinations, however, were made, and as the turnover of workers is high, exposure is likely to be of too short a duration to cause serious damage.

Silica content of particles varied in the different size groups. It was considerably lower in particles below 2·5 microns than in the larger particles. This is considered a favourable factor, as particles below 5 microns are considered to be of respirable size.

Further particle size determinations were made to see what the average percentage was of particles within this respirable size. No significant difference was found in the distribution among different samples collected but most of the dust collected was of respirable size, over 90% of the particles being below 5 microns.

Charles L. Sutherland

VALIC, F., ABDEL SALAM, M. S. & EL-DAKHAKHNY, A. A. **A Reduced Foundry Dust Control Programme.** *J. Egyptian Pub. Health Ass.* 1959, v. 34, No. 6, 175–85, 2 figs.

This dust-control programme is designed for the old and primitive foundries in Egypt so that conditions can be improved with a few structural changes and at little cost.

The methods suggested comprise: (1) Segregation of non-dusty operations. The less dusty processes of core making and moulding should be separated by slight structural alterations from the dusty processes of pouring of metal and of breaking out castings from moulds.

(2) Use of water. This should be carried out to the greatest possible extent. The dust which is thrown into the air during pouring can be largely eliminated by simple wetting of the previously cleaned floor and passages and of the sand. Castings should be allowed to cool down as much as possible before breaking out.

(3) Elimination of silica-containing material. A substitute should be obtained for the silica flour in use; zircon or graphite are suggestions.

(4) Enclosure and isolation of sandblasting. Sand is still used in a number of foundries in Egypt. This method requires an elaborate exhaust system under a most efficient maintenance programme. The climate allows this process to be carried out also in the open air, and care must be taken that this is done in an area isolated from other workers.

(5) Substitution of vacuum suction for compressed air in removing dirt and loose sand from castings.

(6) Good housekeeping.

(7) Ventilation designing. The climatic conditions of Egypt are such that buildings can have a large area of openings. Many places, too, have a steady wind of constant direction and this can be made use of if inlets and outlets are properly placed. In investigating the dust distribution in a building the authors make use of the method of equal-concentration contours, producing charts similar to the familiar weather charts. These have been successful in indicating the direction in which dust is carried and thus showing danger spots.

[By careful work, these authors have made evident the dangers at present in these foundries, and have pointed out remedial measures. One day they will have the satisfaction of seeing the improvement in hygiene they desire.]

Charles L. Sutherland

LÜCHTRATH, H. & SCHMIDT, K. G. Über talkum und Steatit, ihre Beziehungen zum Asbest sowie ihre Wirkung beim intratrachealen Tierversuch an Ratten. [**On Talc and Steatite, their relation to Asbestos and their Effects on the Lungs of Rats after Intratracheal Injection**] *Beiträge z. Silikose-Forschung.* 1959, No. 61, 1–60, 18 figs. [Numerous refs.]

Raw and burnt talc (steatite) are widely used in the ceramic industry in Germany. As cases of pneumoconiosis had been observed among the 7,000 men employed in the Bavarian steatite industry, and as the literature on the talc hazard was contradictory, experiments were carried out and are described.

A lengthy description of the history, mineralogy and geology of talc and of some talc deposits is followed by a chapter on technology and uses of talc. A number of dehydration and dilatometer curves are given. The authors stress that commercial samples of raw talc may contain quartz or asbestos and on burning at 1200°C. talc releases 16% of silica, much of it in the form of cristobalite.

Animal experiments were made with 2 samples of unburnt talc, one steatite mixture used for burning, and one with burnt talc. Intratracheal injections of 50 mgm. of raw talc into rats' lungs led to a very high mortality, but 2 injections of 25 mgm. each per animal (the second injection one week after the first) were tolerated by most of the rats. Observations extended 18 to 20 months after injection and are illustrated by 10 photomicrographs.

The three samples of unburnt talc all gave similar results. There was the usual inflammatory reaction after

one day; the dust was then collected into small deposits around the bronchioles, after one month the deposits became organized with a minimum of reticulin fibres and there was no fibrosis up to 18 months. The dusts were inert.

The calcined dust behaved similarly for 6 months but then formation of fibres began. KING'S grade 1 fibrosis was reached after 7 months, grade 3 after 9 to 10 months, and grade 5 after 17 months in 2 animals. The lesions did not have the texture of silicotic nodules; they were less dense but a loose network of hyaline fibres was formed. Dust was first found in the lymph glands after 2 months, and towards the end of the experiment completely fibrosed glands were seen. The different behaviour of the burnt talc is considered to be caused by the cristobalite in the sample, and the authors doubt whether lung fibrosis can be caused by pure unburnt talc.

G. Nagelschmidt

SCHIMDT, K. G. Asbestsorten, ihre Untersuchung mit optischen Mitteln und ihre krankmachende Wirkung. [**The Varieties of Asbestos, their Study by Optical Methods and their Pathogenic Action**] *Staub.* Düsseldorf. 1960, June 1, v. 20, No. 6, 173–80. [43 refs.]

Asbestos is usually classified rather unscientifically by the characteristics which make it technically useful, by its place of origin, its colour and so on. With modern methods, however, including an elaborate microscopical technique, 11 well-defined varieties of asbestos can be distinguished, the most important of which are chrysolite, amosite, crocidolite, tremolite and anthophyllite. The optical methods used with the polarizing and phase-contrast microscope are described, and the results shown in tables. The chemical and physical properties of the various types are also described, since the chemical composition of the fibres is to some extent responsible for these properties.

In discussing the pathogenic action, the author states that asbestos may possibly undergo changes in the lung. However, it is doubtful how far the different varieties can be recognized in the lung dust. In speaking of the formation of asbestos bodies as a reaction intended to get rid of asbestos in the lung, he suggests that varieties susceptible to chemicals will form these readily. Chrysolite and possibly amosite may do so rather than the kinds of asbestos which are very resistant. Warning is given that the formation of bodies is not necessarily a disease. A considerable controversy has raged over the question as to whether chrysolite or hornblend is capable of producing bodies in the lungs. The literature as regards this and also the question of the action of short-fibred asbestos is reviewed. All forms of asbestos must be regarded as dangerous. It is possible that some types are more dangerous than others but the only way this can be proved is by comparing effects in factories where only one type of asbestos is handled. Such factories are few.

It is suggested that chrysolite, crocidolite, and amosite have long, yielding fibres which can penetrate the lung more easily than the stiff brittle fibres of tramolite and anthophyllite. This would produce mechanical damage; chemical effects might result from the more sens chrysolite and amosite. The iron and aluminium co of the different types may also influence the patho action.

Charles L. Sutherla

TARGOWLA, D. & SMAGGHE, M. G. Enquête sur l'e sition mineure au plomb. Répercussions pa logiques. Valeur des examens hématologi **[An Investigation into Lead Exposure of M Degree. Pathological Results. The Valu Haematological Examinations.]** *Arch. Malad. fessionnelles.* Paris. 1960, Apr.-May, v. 21, 4/5, 222–4.

This investigation was an attempt to find out whe when exposure was slight, blood examinations, as mally carried out in the medical supervision of workers, would show any evidence that would poi lead poisoning eventually occurring, taking into acc the case history. Case records of 347 people, wo mainly in printing works, were supplied by several i trial medical officers. 110 records contained no ab malities of any kind. An analysis was made of remaining 237 to discover whether illness that coul attributed to lead had occurred in even minor degre rheumatic, digestive, cardiac or hypertensive diso The urine had been examined for blood and album 94 cases, with relatively few positive results. The suspicious finding was hypertension in 42 cases, but parison with controls of the same age-groups, similar work with no lead hazard, showed no stati difference. In only 4 cases was the erythrocyte coun than 4,000,000, and stippling was found in only 12. distribution of stippled counts is given, but no perio exposure, though this factor was considered in analysis.

It is concluded that the clinical abnormalities f had no diagnostic or prognostic significance, and periodical blood examinations appeared to be of d able value for screening workers where exposure to was slight.

M. Patricia Fitzsimo

DINISCHIOTU, G. T., NESTORESCU, B., RADULESCU, I IONESCU, C., PREDA, N. & ILUTZA, G. **Studie the Chemical Forms of Urinary Lead.** *Bri Indust. Med.* 1960, Apr., v. 17, No. 2, 141–5, [18 refs.]

From Bucharest, parallel determinations by 2 met show the need for some analytical procedure to esti all the lead in the urine, during screening of exp workers. The time-consuming ashing technique gav total lead (T), and a standard co-precipitation techn gave the precipitable lead (P). While in 44 no subjects the values obtained by both methods were same, P was significantly less than T in 72 he exposed to lead during work; 57 of these had lead soning. As much as 40% of urinary lead esc detection by the second method.

The non-precipitable fraction (T — P) increased the amount of T. The weighted average of the ratio

vas 1·01 in normal subjects, 1·47 where there was ncreased absorption and 1·93 in patients with poisoning.

The chemical characteristics of T — P were investi-gated. Urine, from cases of chronic poisoning in which T and P were known, was shaken with activated alumina nd T and P were estimated in the supernatant. P was ntirely adsorbed; T — P remained in solution. This ndicated that P was ionized, probably as phosphate, vhile T — P was in organic combination. Another table hows the lead content of urine after dialysis; the non-lialysable lead was the same in quantity as T — P. These preliminary tests suggest that T — P is a natural helate, and this is being investigated further.

During prolonged observation of patients with chronic ead poisoning in hospital, the proportion of T — P decreased more rapidly than the degree of illness, prob-bly because absorption had ceased. It is held that the presence of the non-precipitable fraction is related to ead accumulation, and may reflect the degree of expo-ure. It may be found before clinical or haematological vidence. Where lead absorption is high, threatened ead poisoning may be overlooked if co-precipitation nethods of estimating lead in urine are solely used.

M. Patricia Fitzsimons

Boersma, M. J. & Beyer, T. Tijdelijke nierbeschad-iging gedurende behandeling met calcium-EDTA wegens loodvergiftging. [**Temporary Renal Impairment during Treatment with Ca-EDTA for Lead Poisoning**] *Nederl. Tijdschr. v. Geneesk.* 1960, June 11, v. 104, No. 24, 1152–4. [19 refs.]

"Renal dysfunction of a transient nature was caused n a patient, aged 29, by treatment with Ca-EDTA (cal-ium versenate) for lead poisoning. Functional impair-nent was seen in the glomeruli as well as in the tubuli."

Katz, R. A. **Intravenous Urea in the Therapy of Increased Intracranial Pressure with Lead Encephalopathy.** *New England J. of Med.* 1960, Apr. 28, v. 262, No. 17, 870–72. [17 refs.]

In recent years the use of edathamil (EDTA) for the reatment of acute lead encephalopathy has reduced the ncidence of severe neurological abnormalities after ther-py. However, the death rate remains at 15 to 25% and his is probably due to the marked elevation of intra-ranial pressure which has frequently been observed luring the first 48 hours after the onset of edathamil herapy. Most fatal cases have occurred during that eriod.

This paper describes the case of a Negro girl aged 5 vho was admitted to hospital with an acute lead ence-halopathy and an initial cerebrospinal fluid pressure of 00 mm. of water. She was given edathamil and 20 hours fter admission her cerebrospinal fluid pressure had isen to 460 mm. of water. This increased pressure was apidly and consistently lowered to safe levels with the id of intravenously administered urea.

The effective use of urea to lower intracranial pressure n animals was first reported in 1927 and again in 1928. ater studies in 1950 indicated that in animals a more profound and prolonged reduction of cerebrospinal fluid pressure was produced by this agent than glucose or sucrose. In 1955 the results of the first clinical trials were presented, and indicated that urea was useful in human beings as well.

It is recommended that a solution of 30% urea in 10% invert sugar be given by intravenous drip to produce the most consistent and prolonged results. Fluids and electrolytes must be carefully replaced, and the agent is contra-indicated in the presence of renal insufficiency. No toxic effects have been noted from the use of urea and there are no persistent adverse effects on the blood pressure or blood urea nitrogen levels. However, urea must not be autoclaved, and solutions must be freshly mixed before use because it easily decomposes, forming ammonia, and it can then be quite toxic.

It is thought that the mechanism of pressure reduction is one of osmosis, not, fluid loss. *P. J. R. Challen*

Klosterkötter, W. **Effects of Ultramicroscopic Gamma-Aluminum Oxide on Rats and Mice.** *Arch. Indust. Health.* Chicago. 1960, May, v. 21, No. 5, 458–72, 17 figs. [28 refs.]

These investigations were an attempt to answer the question whether exposure of workers to gamma Al_2O_3 causes lung damage. Smelter smoke emitted during production of corundum from bauxite contains it as well as amorphous silica [this *Bulletin*, 1949, v. 24, 208]. The ultramicroscopic powder, which had a tendency to form aggregates, contained more than 95% Al_2O_3 and less than 0·1% SiO_2. A suspension in water of 10 or 50 mgm. was injected intraperitoneally into mice and rats respectively, and one of 35 mgm. intratracheally into rats. In the main inhalation study with high concentrations, some uniformity of dosage was achieved by suspending 200 gm. for 5 hours daily in a 6 m^3 dusting chamber; 145 rats were exposed, some for 285 days. Dust uptake was controlled by determining the Al content of the lung in serially killed animals. Photographs show results beween 45 and 402 days, and electron microscopic work is continuing on the morphology of dust storage.

Massive peritoneal accumulations caused cell damage and marked fibrosis. Intratracheal injection produced dust-cell nodules with grade II and III fibrosis [Belt and King, this *Bulletin*, 1945, v. 20, 776], but no progressive fibrosis. In the inhalation experiment 107 rats died at various times; there was no relationship between the various pulmonary inflammations and dust accumulations. Prolonged inhalation caused alveolar desquamation and secondary inflammation. In the dust foci, cell damage and fibrosis were relatively slight, I and II, with no progressive fibrosis. Lymph glands contained clusters of Al_2O_3-phagocytes and showed no fibrosis. After 4-day exposures, dust elimination from the lung occurred slowly; little Al_2O_3 was found in mediastinal glands 3 months later. This finding reverses the view that rapid elimination is a characteristic of submicron dusts.

It is concluded that gamma Al_2O_3 is only slightly pathogenic, less fibroplastic and toxic than SiO_2, but with continuous high concentrations lung fibrosis can occur. Workers would avoid such high concentrations

because of coughing, but gamma Al_2O_3 cannot be dismissed in considering the pathogenesis of corundum smelter's lung, even though amorphous silica is of greater significance. *M. Patricia Fitzsimons*

KRÖGER, J. Sicherheitsmassnahmen beim Umgang mit Aluminiumalkylverbindungen. **[Safeguards for Work with Aluminium Alkyl Compounds]** *Zent. f. Arbeitsmed. u. Arbeitsschutz.* 1960, May, v. 10, No. 5, 101–3.

Aluminium alkyl compounds are being used in industry to an increasing extent, and their most important application is as catalysts in the production of polyethylene. Other uses which have been described are in the refining of aluminium, the production of tetraethyl lead and the synthesis of primary alcohols.

This paper contains an account of the chemistry involved in the production of aluminium tri-ethyl and of the chemical reactions of this and other alkyl compounds. In strong solution these compounds are very corrosive to the skin and inhalation of their vapours may cause bronchial irritation. The fumes are perceptible in an atmosphere even in low concentration as they are white in colour from the aluminium oxide they contain and in addition have a strong, musty odour.

There is a long description of the essential safeguards to be taken for the workers which are based on the chemical character and high reactivity of these aluminium compounds. These precautions may include the use of masks and protective clothing and against fire, and adequate ventilation. Great care is also needed in the manufacture of the alkyl compounds since they are made under high pressure. Contact of the compounds with water must be avoided and for transport special containers are essential. These containers are filled and emptied in an atmosphere of dry nitrogen. Even small amounts of the compounds should be stored under a dry inert gas such as nitrogen or argon.

M. E. Delafield

OVEDOFF, D. L. & REINHOLD, F. **Parkinsonism due to Manganese Poisoning.** *Med. Proc.* Johannesburg. 1960, May 7, v. 6, No. 9, 195–7. [14 refs.]

The history and neurological findings described in 5 patients show that parkinsonism developed after relatively short exposures, from 6 to 24 months, to manganese fumes in a factory in Johannesburg where ferromanganese steel is produced. Apparently the oldest was a European aged 43. His neurological symptoms had appeared suddenly when he had a severe cough, and the possibility of manganese pneumonitis is mentioned. When seen 9 months after exposure had ceased, the neurological disease appeared static. Of 3 Africans, 2 had signs of peripheral neuritis, not previously described in manganese poisoning; no other aetiological factor was found, though there was a possible history of alcoholism in one.

The characteristic features were excessive tiredness and sleepiness, muscular pains, impairment of speech and difficulty in swallowing, and abnormal gait and extreme facial immobility. Several of the features are u mon in postencephalitic and arteriosclerotic p sonism, though typical of manganese encephalo and some are usually only seen, in the degree desc in the final stages of extra-pyramidal disease, and relatively early cases such as these.

M. Patricia Fitzsim

TATARSKAYA, A. A. **[Occupational Diseases o Upper Respiratory Tract in Persons engag Departments of Electrolytic Refining of N** *Gigiena Truda i Professional'nye Zabolev* Moscow. 1960, June, v. 4, No. 6, 35–8. Russian.] English summary (7 lines).

This paper describes the findings of a clinical ir gation over 1½ years into the upper respiratory (URT) in 486 persons, who are exposed to a grea lesser extent to an atmosphere containing compour nickel (mostly the sulphate) in the form of an ae

The two main processes are electrolysis and re and it is in the latter that the greatest polluti nickel-sulphate was observed. The workers were di into 4 groups. (1) Workers in the refining depart (2) workers in the electrolysis department; (3) pe working in both departments, often at exposed ap tus, *e.g.* fitters; (4) office workers.

An occupational history, with attention to cond likely to have affected the URT was taken. Olfa sense was tested with: 10% solution of cocaine spirit, infusion of valerian, vinegar, spirituou ammoniac. 65·5% of the subjects were under 40 of age and the overwhelming majority had work the factory for more than 5 years.

The most frequent complaints were of dryness, ing in the nose, obstruction of nasal breathing, bleeding and absence and diminution of the sen smell. The greater the time spent in a process the h the incidence of symptoms, but there was no corres ing relationship with severity. The character of s toms, however, changed according to the length of in a department, initially they were sneezing, smarti the nose and thin discharge. Then nasal haemorr occurred which after a time stopped complete became infrequent and slight.

Objective changes are given in the table:—

	Diagnosis	*Freq*
Diseases of the Nose	Chronic Catarrhal Rhinitis	
	Anterior, dry Rhinitis	1
	Subatrophic Rhinitis	1
	Erosions	1
	Ulcers	1
	Perforation	
Diseases of the mouth and pharynx	Subatrophic pharyngitis	
	Atrophic pharyngitis	
	Chronic tonsilitis	
Diseases of the larynx	Chronic Laryngitis	
Disturbances of the sense of smell	Anosmia	3
	Hyposmia	3

Perforations appeared after 1½ years, and after 1 year in he department they were not associated with an atrophic nucosa, often in fact they appeared with a tumescent amp mucosa. The highest frequency of lesions of the asal mucosa was noted in the first group of workers, ess in the second and third groups and insignificant in he fourth group.

160 persons had anosmia, the diagnosis being made vhen, except for the smell of spirit, the remaining smells vere not perceived. Hyposmia, in 149 persons, varied rom slight (only the smell of cocaine missed) to marked. There was no relationship between morphological state f the nasal mucosa and olfactory function.

Repeated observations showed that erosions of the asal septum did not appear to progress. During holi-lays the erosions cleared, but in some persons they eappeared on resuming work in the section.

W. R. Lee

American Indust. Hyg. Ass. J. 1960, June, v. 21, No. 3, 265–71. [12 refs.] **Hygienic Guide Series. Acetonitrile; Diethylamine; Nitropropane; Diethylene Triamine; Tetrachlorcethylene.**

London M., Serban, P. & Popovici, C. La valeur de certaines modifications hématologiques pour l'appréciation de la toxicité du nitrobenzène. [**The Value of Some Haematological Changes in Estimating Nitrobenzene Toxicity**] *Arch. Malad. Professionnelles.* Paris. 1960, Apr.–May, v. 21, Nos. 4/5, 205–10, 4 figs.

Blood and marrow were examined in rabbits during cute nitrobenzene poisoning to find out what changes vere taking place and to assess the diagnostic and prog-nostic value of certain tests. Blood changes, as percent-ages of initial values, are described, some shown in graphs for 36 hours after subcutaneous injection of 0·75 gm. of nitrobenzene. Not all the changes were constant n 27 rabbits.

Red blood cells decreased to 67%. In 20 animals, erminal haemolysis caused a greater decrease, mean 57% (approximately). These animals showed a reticulo-cytosis which reached 217%; control values remained evel at about 100%. In the remaining 7, there was no haemolysis, and the reticulocyte response was less, 126%. Heinz bodies were found in only 17. The mean percent-age of Heinz-body-cells rose to 93%. However, in some animals there were large numbers from the start, and in others the numbers remained small. Other standard red cell examinations revealed minor changes.

Methaemoglobinaemia reached maximum, 4% of haemoglobin, between 12 and 16 hours after poisoning. Methaemoglobin then decreased and, as the illness became worse, disappeared—unlike sulphaemoglobin in other experiments.

A tendency towards leucopenia, 69%, was found, even n animals that did not develop severe anaemia. In some here was a transitory terminal leucocytosis.

Thrombocytes decreased in most of the animals to 77%, with a corresponding increase in coagulation time, 159%. The control values were 130% and 118%.

Marrow puncture showed a changing picture from hyperplasia to hypoplasia, and even aplasia. In most animals, macrocytes increased, 691%, and peripheral medullary reticulocytes decreased from 2·33 to 1·28. Megakaryocytes decreased to 48%.

The results as a whole show several changes of consequence, though no finding was specific. This should be taken into account when estimating tolerable limits and assessing the course of poisoning.

M. Patricia Fitzsimons

Ghetti, G. Escrezione urinaria di alcune ammine aromatiche in lavoratori addetti alla produzione ed all'impiego di benzidina, benzidine sostituite e loro sali. [**Urine Excretion of Some Aromatic Amines in Workers employed at the Production and Use of Benzidine, Substituted Benzidine and their Salts**] *Med. d. Lavoro.* 1960, Feb., v. 51, No. 2, 102–14. [12 refs.] English summary.

The capacity of aromatic amines to produce tumours has been shown both clinically and experimentally: they act on the epithelium of the bladder where they may produce papillomata or cancer. An early diagnosis depends on cystoscopy and on careful examination of the urinary sediment.

The authors have investigated the occupational hazard of those who handle benzidene, its chemical modifications and their salts and they measured indirectly the amounts absorbed by those at risk through estimating the rate of excretion in the workers' urine. They explain the technique used in these tests. They examined 37 such workers and, as controls, 137 other subjects. The urine from the controls was invariably negative for amines, which were found in the urine of those at risk in concentrations which varied with the degree of exposure and other relevant circumstances.

Using the same indirect methods of measuring absorption, the authors experimented with dogs [no number stated] and first examined their urine on 30 consecutive days with negative results. The dog was then given 100 μgm. of benzidine by mouth, and amines appeared in the urine and continued to be found for the following 6 days. Aerosol inhalations and endotracheal administrations of similar amounts had similar results. An area of the dog's skin was then shaved, 50 μgm. of benzidine was applied to the shaved part which was then covered over with a waterproof dressing: this resulted in a much higher rate of absorption.

It is too early to determine maximum tolerance limits of amines as found in the urine of workers at risk. The effectiveness of logical protective measures was demonstrated in the course of these investigations, in the later stages of which the samples of urine submitted to testing had to be raised from 20 to 100 cc. *J. Cauchi*

Chiecchio, D. Contributo allo studio di nuovi metodi di controllo biologico nella intossicazione cronica da tritolo. [**Contribution to the Study of New Biological Control Methods in the Chronic Poisoning caused by TNT.**] *Med. d. Lavoro.* 1960, Feb., v. 51, No. 2, 115–22, 1 fig. [23 refs.] English summary.

The author is seeking a satisfactory method for the biological control of the occupational hazard to which workers are exposed in the manufacture of TNT. The finding of its end-product—2–6, dinitro 4-amino-toluene—in blood and urine is an indication of metabolism of TNT in the worker. Chiecchio describes 2 new methods for the estimation of this end-product, which he has applied in the case of 5 workers whose exposure to the hazard ranged from 3 to 6 years: 2 sieved the product, 2 weighed it and the other employee packed it. There were exhaust hoods above the sieves and good provision for fresh air ventilation elsewhere. The product is handled in combination with dinitrotoluol which reduces dryness and dustiness. The workers apply a barrier cream to hands and forearms, wear rubber gloves and filter face masks at the sieves, wash before meals and take a shower at the end of each shift.

Standard solutions of known quantities of the product were compared with samples of urine and blood from the workers, following a photocolorimetric technique. In the case of urine the base colour was found to interfere with correct readings, but usefully accurate estimations can be made with specimens of blood and these were taken at the end of a shift and also on Monday mornings, 40 hours from the last previous exposure. At the end of such an interval the concentration of 2–6, dinitro 4-amino-toluene in the blood had become reduced by 26%.

Chiecchio tabulates his findings which show that the metabolite can be demonstrated in the blood, indicating absorption of TNT, even when safety and protective measures are in force and personal hygiene is good.

J. Cauchi

MARTELLI, D. Tossicologia della dimetilformamide. [**Toxicology of Dimethylformamide**] *Med. d. Lavoro.* 1960, Feb., v. 51, No. 2, 123–8. English summary (7 lines).

Dimethylformamide is a solvent used in the manufacture of synthetic fibres, and its toxicology is little known yet. It is a colourless liquid, specific gravity 0·9445, boiling at 153°C. and flashing at 445°C. In the environmental atmosphere, a concentration of 50 p.p.m. has been set as a tolerance limit. Its use in industry involves boiling with liberation of fumes and workers are also liable to breathe in the chemical when servicing the plant; spilling may bring it in contact with the skin and accidental ingestion may also occur.

Martelli has studied the toxicology of dimethylformamide in guineapigs, employing 6 groups of 3 animals. Through a tube, 10 cc. of the chemical were introduced into the stomach of each of 9 fasting animals. The substance smells of decomposed fish and has a nasty taste and the guineapigs showed some revulsion but there were otherwise no symptoms until near death which supervened within 5–7 days.

The backs of the other 9 guineapigs were shaved and 10 cc. of the chemical were applied daily in a compress under a waterproof dressing. Death occurred in 7–8 days and signs and symptoms, again, were only terminal.

Post-mortem examination showed degenerative changes in liver and kidneys with pulmonary congestion. The stomach of the first 3 lots of animals showed the ical to have had a corrosive action on the mucosa.

Martelli has noted evidence of liver involvem workers with the chemical. He urges medical ex tion before, and periodically during, employmen the exclusion of any workers who show any evide abnormality of chest, liver or kidneys. He advis obvious protective measures, environmental and sonal, including immediate washing-off when the cal comes in contact with the skin. *J. Ca*

PISANI, F. Patologia degli operai addetti alla pr zione degli ftalati di ottile e di butile. [**Path of the Workers employed in the Preparati Octyl and Butyl Phthalates**] *Med. d. Lavoro.* Feb., v. 51, No. 2, 137–43. [12 refs.] E summary (5 lines).

These chemicals are used in the plastics industry, added to gums, resins and cellulose esters as solven gelatinizers and to help preserve and improve resis resilience and other properties. They are manufa from phthalic anhydride which is an irritant of the eyes, throat and chest in both vapour and powder In the solid state, this chemical can cause burns vary in degree according to the duration of contac

Pisani has kept under observation 20 w employed on the manufacture of phthalic anh for 2 years. All have complained of irritati the eyes and of the respiratory passages, with sn and coughing. 3 have had signs and symptoms s tive of a spastic type of bronchitis. 8 have peri headaches, generally associated with dizziness. 5 from heartburn, epigastric discomfort and other toms suggesting chronic gastritis.

On examination, Pisani found conjunctival and congestion in 14, pharyngeal congestion in 17 and signs of bronchial involvement in 3. 8 showed enlargement and tenderness of the liver, but the community is liable to some hepatic insufficiency be due to diet. Nothing abnormal was found in blood or skin.

Protective measures should include light panc spectacles, overalls and gloves; masks are desira protect the face but these workers found that they not wear them for more than one hour at a time. over, and exhaust hoods above, the containers appropriate ventilation of the premises control th persion of vapours, and showers are provided with facilities for personal hygiene. Pisani gives advi first aid in cases of poisoning. *J. Cau*

MACDONALD, W. E., LANIER, G. E. & DEICHMANN, **The Subacute Oral Toxicity to the Rat of Ce Polydimethylsiloxanes.** *Arch. Indust. H* Chicago. 1960, June, v. 21, No. 6, 514–18.

Silicone fluids of this type are being increasingly in the food industry and have a low toxicity. dimethylsiloxanes, $((CH_3)_2SiO)_x$, have a viscosity di related to the value of x. In these investigatio were selected which had a range of viscosity (at 2

from 50 to 60,000 centistokes (cs)—the intermediates 350, 1,000 and 10,000 cs. A control group of 40 rats and 5 experimental groups, each of 10 male and 10 female rats, 5 in each cage, had a basic diet, supplemented by 1% cod liver oil, for 90 days and each experimental group had 1% by weight of 1 of the silicones in the diet.

Tables show results of several investigations in all groups, some for the group and others for half the group, at the start, half-way through and at the end, when all animals were killed and pathological examinations were made.

There were no deleterious effects from the silicones. The experimental animals gained less weight than the controls and consumed less food, but insignificantly less. In all 6 groups some animals had pneumonitis and fatty changes in the liver; 1 experimental animal (60,000 cs) died from the respiratory infection. In blood counts, weights of heart, lungs, liver, spleen, kidneys and testes, and in histological examination of these organs and ovaries, aorta, uterus, stomach and intestine, there were no differences between controls and experimental animals. [See also PAUL and POVER, this *Bulletin*, 1960, v. 35, December.] *M. Patricia Fitzsimons*

VON OETTINGEN, W. F. **The Aliphatic Acids and their Esters: Toxicity and Potential Dangers. Relation between the Physical-Chemical Properties and the Pharmacological Effects of Saturated, Monobasic Aliphatic Acids.** *Arch. Indust. Health.* Chicago. 1960, May, v. 21, No. 5, 404–23, 5 figs. [Numerous refs.]

This section, the third of the series, begins by summarizing the properties discussed previously [this *Bulletin*, 1960, v. 35, 547, 548]. It goes into much detail. Acids have been used since ancient times for the preservation of food and many of the aliphatic acids are constituents of fat. The pharmacological studies which are reviewed deal largely with these implications.

Inhibition of enzymes, penetration into living cells, bactericidal and bacteriostatic action, fungicidal and fungistatic properties and effects on organisms such as, for example, blowflies are described. Absorption and fate are given prominence, partly because of the nutrient value, partly because of the ketogenic action of some acids. Several tables and figures give comparative values.

Toxicity studies are few and comparison is only possible with a few acids. It appears however that toxicity of saturated fatty acids is low. Some experimental results, mainly with the sodium salts of the lower acids, on the central nervous system, heart and circulation and intestine are discussed. Investigations on taste and the irritant effect on human skin are mentioned, and also haemolytic activity and haematin formation.

Many authors' results are gathered together in such a way that variations within the homologous series, whether of physical or chemical properties, are used to explain mechanisms of the effects of fatty acids and their esters on living organisms and cells.

M. Patricia Fitzsimons

KODAMA, H. **An Experimental Study of the Coal Tar Pitch Poisoning in Animals.** *Kyushu J. Med. Sci.* Fukuoka. 1959, Oct., v. 10, No. 5, 179–84, 1 text fig. & 6 figs. on pl.

Percutaneous absorption of 30% or 5% solutions of pitch in xylene, ether or olive oil gave rise to acute poisoning in rabbits when the solution was applied once daily for many days to an area 8 × 8 cm. on the back, and chronic poisoning when applied every few days. It caused death in some cases; the liver was affected first and there was some inhibition of haemopoiesis. 9-day charts show marked loss of weight in acute poisoning. Several serum biochemical estimations are presented in tables for the various experimental animals and also for the controls which were given skin applications of xylol or ether only; average values are also given for 9 untreated animals. Serum globulin and cholesterol were increased. SAWADA's sublimate reaction was reduced. The thymol flocculation, zinc sulphate turbidity and bromsulphalein tests gave increased values.

The blood changes noted were slight anaemia, leucopenia with marked lymphocytopenia, and some reduction in platelets. Clotting and bleeding times were slightly increased.

Photographs illustrate the histological appearances in the skin, liver and myocardium. The liver showed haemorrhagic, coagulative necrosis, with infiltration of fat and leucocytes. The heart muscle showed necrotic degeneration. The spleen contained increased macrophages and some haemosiderin.

The local effects were acute dermatitis, epilation and crusting followed, in chronic poisoning, by improvement and thickening. There was papillary proliferation and cornification of the epidermis and hair follicles, and so-called follicular epithelioma.

The increased use of tar products in the chemical industry, with the consequent rapid development of the tar industry, has shown the need to study the effects of pitch, one of the by-products. *M. Patricia Fitzsimons*

STASSEN, P., Jr. Intoxication par oxyde de carbone. [**Carbon Monoxide Poisoning**] *Arch. Belges Méd. Sociale, Hyg., Méd. du Travail et Méd. Légale.* 1960, Mar., v. 18, No. 3, 201–7.

In this description of CO poisoning and the anoxia and pathological changes which follow and which should determine treatment, it is stressed that there are many intermediate states between unconsciousness and inconclusive symptoms. Often the only way of arriving at the diagnosis is by paying attention to the account given by rescue teams of the patient's condition when found, or to his environment. The presence of CO in the blood can only be estimated, in the living, during the few hours shortly after exposure has ceased. It is recommended that casualties brought to hospital should have a label giving the time and circumstances of the accident. There are relatively numerous cases where symptoms can be alleviated when it is discovered that there is slight or continuing exposure to CO and treatment designed to alleviate the consequences of cerebral anoxia is instituted.

Immediate treatment with oxygen and carbon dioxide

is advocated. Methods of treatment which have been tried for psychoneurotic symptoms are mentioned. These were disappointing until, in 1956, slow intravenous injection of Novocain was used as a result of reports of its value in overcoming anoxia and oedema. Several cases are described in which Novocain, 1% solution without any adrenaline, was injected at a rate of 1 cc. per minute. In coma the total dose was about 20 cc., the patients coming out of coma after about 15 cc. Other patients became less agitated or less confused and remained well after 10 cc. given in 10 minutes.

The author has arranged with the Station Centrale de Sauvetage that their ambulance boxes should contain sterile 10 cc. syringes and ampoules of Novocain solution. He also advises that doctors should carry these ampoules in their emergency bags. [See also this *Bulletin*, 1952, v. 27, 675.] *M. Patricia Fitzsimons*

WASSERMANN, M., SĂNDULESCU, G., ILIESCU, S. & MANDRIC, G. Recherches sur les conditions de milieu et sur la pathologie professionnelle des agents désanophélisateurs. L'intoxication chronique par l'hexachlorocyclohexane (H.C.H.). I. Les caractères hygiénico-sanitaires des conditions de travail des agents désanophélisateurs. **[Chronic Intoxication with Benzene Hexachloride. I. The Hygienic Characteristics of Working Conditions for Anti-Anopheles Workers]** *Arch. Malad. Professionnelles.* Paris. 1960, Apr.–May, v. 21, Nos. 4/5, 195–200.

The malaria eradication programme in Rumania has raised the question of the toxic risk to workers involved in the prolonged use of chlorinated hydrocarbon insecticides. BHC, which since 1951 has been used almost exclusively in Rumania, was the subject of this investigation. Exposure by inhalation and by deposition on exposed skin were estimated in mgm. per kgm. body weight. The concentration of BHC vapour in the air during various phases of the work was measured. By far the highest concentrations, up to 46·3 mgm. per cubic metre, occurred during mixing operations either from emulsions or crystals, the peak value on opening a fresh container of emulsion. The highest value obtained during actual spraying was 10·9 mgm. per cu. m. The average amount inspired amounted to 0·49 mgm. per kgm. in an 8-hour day. Deposition was calculated from that on filter papers carried on the shoulder, forearm, throat and neck of workers while spraying. It averaged 1·17 mgm. per kgm. in 8 hours.

The cutaneous exposure therefore was more than twice that of inspired vapour. [One cannot help wondering at this result.] However, experimental data have indicated that in the white rat the LD50 of lindane is 500 mgm. per kgm. by the cutaneous route, 200 mgm. per kgm. by the oral route and 25 mgm. per kgm. by the intravenous route. The last is considered to be the closest approximation to the inhalation route. The current experiments were carried out with technical BHC, 10 to 20 times less toxic than the pure gamma isomer. Also one should be cautious in applying rat data to man. Nevertheless it can be deduced that the main toxic risk to a sprayer is through inhalation rather than cutaneous deposition. In practice, deposits are remove frequent washing of hands and face, but inhalati disregarded, and it is difficult to get workers t masks.

The precautions recommended are, firstly, to m nize, the transport of spraying equipment so tha worker, relieved of this effort, will be more agreea using a mask. Also, it has been found that mech tion of spraying operations diminishes the aerial co tration of insecticides. At the same time, helmets colonial type equipped with veils should be issued. tective clothing of synthetic fibres has been found effective. Workers should be educated in regard t toxic hazards. *B. B. Wa*

RAHMAN, J., SINGH, M. V. & DATTA, S. P. **Toxici Dieldrin to Human Beings.** *Bull. Nat. Soc. for Malaria & other Mosquito-Borne Dis.* May, v. 6, No. 3, 107–11.

Two men in a spraying squad drank water fr bucket which had been used to store dieldrin; eac taken only a few sips. On realizing what had hap one made himself vomit but the other failed to and within a few hours each had a convulsion sweating and loss of consciousness, lasting 15–30 mi One of these men had a second attack 3 months la

Similar attacks are also reported in 3 other mer had been working with dieldrin, and some of these had repeated attacks. In these cases the poisonin probably due to inhalation of dieldrin, or skin c with it. The men were transferred to squads wo with DDT, and face masks were introduced fo dieldrin squads, who were also instructed to exposed parts of the skin thoroughly. No more occurred.

Contamination of water, even with small quantit the insecticide, is very dangerous, and careful ha and scrupulous cleanliness of hands and utensil essential to prevent poisoning. *Charles Wilco*

KHAIRY, M. **Effects of Chronic Dieldrin Ingesti the Muscular Efficiency of Rats.** *Brit. J. I Med.* 1960, Apr., v. 17, No. 2, 146–8, 2 figs.

These experiments were undertaken by one o Medical Research Council groups because muscle t ing is one of the symptoms reported in sprayers dieldrin poisoning [this *Bulletin*, 1958, v. 33, Muscular efficiency was measured by the times tak trained rats to pull increasing weights for a sta distance in a 250 cm. runway. Each rat wore a h with a line which unwound a wheel, geared to a s one which, as the hungry rat ran towards its food, an attached weight tray. The effort was th translated into vertical lifting through 50 cm.

For 60 days before training started, 2 groups, E E 2, received in their daily diet respectively 25 a p.p.m. dieldrin, *i.e.* approximately 0·125 and 0·25 per 100 gm. body weight daily, and the controls, C the same diet without the insecticide. When a animals had reached the training criterion, *i.e.* 9 r

arness in a total time of 60 seconds or less on 2 consecutive days, 10 weight-pulling tests were run daily. On he first day, 25 gm. was the weight on the tray, corresponding to lifting 5 gm. through 250 cm. On the following days the weights lifted corresponded to 10, 20, 30, 40 nd 50 gm.

In food intake, weight and learning, as measured by he number of trials run to reach the training criterion, here were no differences between the 3 groups. The xperimental animals showed no symptoms attributable o dieldrin, except in weight-pulling. The mean weight-ulling scores were as follows for 5 gm., 40 gm. and 50 m.: Group C, 6·8, 6·6 and 6·6 seconds; Group E 1, 5·0, ·3 and 13·3 seconds; Group E 2, 4·8, 11·5 and 15·5 econds. This progressive deterioration in muscular fficiency was even more apparent when each experiental animal's times were compared when pulling 5 gm. r heavier weights.

Further experiments are necessary to find the cause of he deterioration, but the results suggest lines along hich early or preclinical effects of dieldrin absorption ould be investigated [*ibid.*, 1958, v. 33, 488].

M. Patricia Fitzsimons

DAVIES, D. R., HOLLAND, P. & RUMENS, M. J. **The Relationship between the Chemical Structure and Neurotoxicity of Alkyl Organophosphorus Compounds.** *Brit. J. Pharmacol. & Chemotherapy.* 1960, June, v. 15, No. 2, 271–8. [16 refs.]

Some organo-phosphorus compounds produce a progressive ataxia and weakness in hens which starts 10 ays after the subcutaneous injection of a single dose. 6 compounds falling into 5 chemical groups, together ith 9 miscellaneous compounds, were tested in this way n hens. Acute poisoning by the anticholinesterase action f these compounds was prevented by giving an injection f atropine sulphate and 2-hydroxyimino methyl-N-ethyl pyridinium methanesulphonate (P2S). This subtance reverses the inhibition of cholinesterase but does ot influence the development of the neurotoxic damage. ll of the 11 compounds of the type $(RO)_2$ POF where R=alkyl group, were neurotoxic and the 5 compounds RO)(R)POF were also toxic.

None of 5 pyrophosphonates or 9 miscellaneous compounds, all with similar R groups but different substituents in place of the F, were toxic. The possible mportance of fluorine in the mechanism of the toxic ction of these compounds is discussed.

The authors also conclude that under appropriate onditions these compounds would produce neurotoxic lamage in man.

J. M. Barnes

VAN NOORT, H. R., MANDEMA, E., CHRISTENSEN, E. K. J. & HUIZINGA, T. Dinitro-ortho-cresolvergiftiging bij sproeiers. [**Dinitro-Orthocresol Poisoning due to Agricultural Sprays**] *Nederl. Tijdschr. v. Geneesk.* 1960, Apr. 2, v. 104, No. 14, 676–84, 7 figs. English summary.

The authors describe 5 cases of intoxication with dinitro-*ortho*-cresol which occurred among agricultural workers using the compound as a weed-killing spray in cornfields in Holland in spring, 1954. The patients complained of sensations of heat, shortness of breath and sweating. In 1 patient who was not seriously ill on admission to hospital the condition deteriorated rapidly and death occurred in convulsions. One patient recovered without treatment, and the others were given infusions of 5% glucose, vitamin A, α-tocopherol, cyanocobalamine and methylthiouracil. The content of dinitro-*ortho*-cresol in the serum was determined by adding alkali, extracting into methylethylketone and determining the concentration of the compound colorimetrically. Serum levels of 5, 10, 40, 100 and 1,000 μgm. per cc. were found, the highest level being in the patient who died. In 35 sprayers investigated in 1955 serum levels of 9–130 μgm. per cc. were observed in spite of the use of fresh-air helmets and protective clothing. Field observations carried out in 1956 further suggested that the compound could be absorbed through the skin, and in 2 volunteers who immersed their feet in a 1% aqueous solution for 8½ hours a serum level of 27 μgm. per cc. was found. Lower serum levels were found under field conditions when plastic gloves were worn.

D. J. Bauer

MORANDO, A. Osservazioni su particolari manifestazioni cutanee ed epatiche legate alla lavorazione del catrame. [**Observations on Some Particular Cutaneous and Hepatic Manifestations due to Processing of Tar**] *Med. d. Lavoro.* 1960, Feb., v. 51, No. 2, 144–9, 2 figs. English summary (8 lines).

Morando bases his paper on experience with 18 workers who have been employed in the tar industry for from 9 to 19 years. The hazards include accidental burns from hot and from ignited tar. Those who handle tar and its products may suffer from erythematous and vesicular forms of dermatitis, their skin may become sensitive to light and the forearms especially may develop a "marble" pattern of marking. Morando's patients have complained of headache, tiredness, loss of appetite, nausea and intestinal disturbances which suggest some involvement of the liver. They were liable to conjunctivitis.

Occupational exposure to tar is known to be sometimes followed by warts on the lobe of the ear or on the dorsal aspects of hands and forearms, and these growths may later become carcinomatous and even produce metastases, perhaps years after exposure to the causative irritant has ceased. None of Morando's patients developed these skin growths but they have an X-ray examination of the chest every year.

The paper briefly refers to the preventive measures which are desirable to control the occupational hazards in the tar industry.

J. Cauchi

FINNIE, J. S. **Oil Folliculitis. A Study of 200 Men employed in an Engineering Factory.** *Brit. J. Indust. Med.* 1960, Apr., v. 17, No. 2, 130–40, 6 figs. [25 refs.]

Occupational distribution and other environmental influences were investigated by rating the degree of

folliculitis on a diagrammatic representation of skin lesions on the extensor surface of both forearms. Photographs of skin illustrate some ratings, *e.g.* rating 2, moderate comedones only, involving 3 to 6 of the 6 compartments into which the arm was divided. Ratings 0 to 5 were combined in pairs to form 3 groups, A minimal, B moderate and C marked folliculitis. An illustration of rating 3 which shows pustules; which should presumably fall into Group B, is marked Group C.

Of 16 coded occupational groups, 3 had higher proportions of Groups B and C. They were drillers and capstan-lathe and automatic-lathe operators. These were 3 occupations which had been classified as causing heavy exposure to oil. In them, the average duration of exposure and the average age were less than in most of the others, and the incidence of previous occupational dermatoses was high. A barrier cream had been used by 33 of the 78 men, and 51 had good home washing facilities, higher proportions than in the low-risk occupations. Where exposure was high, young men after short exposure developed the more severe, chronic and recurring lesions which had not been prevented by hygiene facilities.

Photographs of minimal skin contamination tests show oil fluorescence after washing with soap and water for 15 seconds. A skin cleanser was efficient, but was used by only 20 of the 200 men examined and interviewed. No man had left or had been transferred to other work because of folliculitis for some years, and no precancerous or malignant lesions were seen. The factory had been engaged in production for less than 10 years, but some men had been exposed to oil for longer, *e.g.* inspectors who had previously been machine tool operators, average 25·8 years.

No connexion could be found between degree of folliculitis and type of oil because most of the men were exposed to mixed oils, except that all 6 automatic-lathe operators, all Group C, were exposed predominantly to an insoluble oil of high viscosity, the only one used on their machines. This occupational disease will occur until engineers design machines where contact between cutting coolant and operator's skin cannot take place. It is not sufficient to provide personal facilities and preventive measures.

M. Patricia Fitzsimons

VIDAL, L., PLATZER, R., TOULET, J. & HUGOT, G. niques de dosage de l'uranium. Application surveillance du personnel. **[Techniques fo Estimation of Uranium and their Applicati the Surveillance of Personnel]** *Arch. M Professionnelles.* Paris. 1960, Mar., v. 21, 1 134–9. [Refs. in footnotes.]

Uranium is both chemically and physically toxic body and the authors cover a wide field in this arti the techniques at present in use for the detectio measurement of uranium with their bearing upo protection of personnel.

Practical methods have to be adapted to part requirements and the authors give very illuminatin in Table I about the chief of these requirements. may be summarized as follows:—

Activity	*Chief requirements of M*
Geo-chemical prospecting	Precision, rapidity, simpl paratus
Pure physics	Very great precision
Extraction, concentration & separation of mineral	Dealing with the presen a great number of elements—Routine
Study of uranium alloys	Precision
Study of diffusion	Precision
Study of purification	Precision
Biological—uranium in urine, blood etc.	Rapidity—Routine

Two main methods of physical measurement described, one based upon alpha-ray counts of the sion from the parent uranium, the other base fluorimetry. Uranium salts are excited to lum activity when they are exposed to ultra-violet rad and this light can be compared very accurately suitable standards. It is in fact the method favour the authors both by virtue of its rapidity and its cision. The authors refer to work in Americ attempts to increase the elimination of uranium *v* urine by the use of versenate. The success claimed has not been substantiated by the authors' investiga [No details of these are given.] Although, as s fluoroscopy is the method of choice for precision the authors are still concerned in perfecting poin technique. [A very useful contribution to an impo subject.]

S. R

Food and Nutrition

The order in this section is:—**General; Foodstuffs; Food Poisoning.**

FOODSTUFFS

(Composition and Bacteriological Control)

PIRIE, N. W. **New Foods for World Needs.** *Roy. Soc. Health J.* 1960, May, v. 80, No 3, 198–203, 3 figs. Discussion 203–5.

Between 1938 and 1953 the proportion of the world population receiving an average daily supply of less than 2,200 Calories had increased from 49% to 66% Food and Agriculture Organization figures since have presented the same picture. Twice as much is needed as we are getting now, and within a lif this need will be doubled. The relative lack of p

ods is even greater and therefore the author gives me consideration to proteins.

When the maximum possible amount of vegetation is oduced in the world, it will still be necessary to make best use of the land and crops that will be available. e photosynthetic yields of all available crops are out the same in comparable conditions. Practical con-eration can be limited to cereal and root crops, and leafy crops. Leafy crops grow continuously, may be rvested continuously, and will grow anywhere other n in deserts or Arctic regions. Despite these advant-es, insufficient use is made of them. Though they are own as animal crops, this is wasteful as the return m protein put into the animal as fodder is only from o 15%.

Immediate improvements could be made in the present derfed regions by eating leaf-vegetables as such, and gm. of protein per day can be added to a diet in that m. Owing to the bulk of indigestible fibre there is a it to the amount of leaves that can be eaten, but ping and processing of leaves can greatly increase ir efficient use as food. The author refers to a ocess that he has already described [Pirie, this *Bulletin*, 50, v. 35, 239].

Equipment has been designed to pulp the leaves of table crops, yielding juice and fibre. The juice is ated to obtain a protein coagulum which can be used food by man and non-ruminants, and a residual liquid ich will grow a wide range of yeasts and bacteria. ere is good reason to believe that micro-organisms own from organic wastes such as this could be used onomically as a bulk source of food. The protein agulum compares favourably with fish meal as a pro-n source, and the problem of presenting it as an ceptable food has been tackled with considerable ccess, particularly as a mixture with banana-pulp. A mber of acceptable preparations were demonstrated by author, and it is estimated that 10–20 gm. of protein day out of a total requirement of 40–80 gm. could supplied in food prepared from the leaf-protein. It uld serve as a useful supplement to protein obtained m staple cereals, and would be of particular value in cieties depending on roots such as yams or cassava. e fibrous residue is very acceptable as a fodder for minants, and also as a substrate for microbial fermen-ion. All products obtained from the leaf may thus be ed efficiently as sources of protein, and there are other uable nutrients.

In the discussion it was emphasized that foods pre-red from leaf-protein are not by-products, and there-e costs cannot be fairly compared with the fictitious st of skimmed milk, which is given away or sold at a minal price. Education is needed to promote a alization of the urgent need for more protein food-ffs, particularly for children. The machine that has en developed would be suitable for village use, and obably a unit designed for a small town or large village uld be the most practical, run co-operatively by 0–300 people.

T. P. Eddy

Woodburn, Margy J. & Strong, Dorothy H. **Survival of *Salmonella typhimurium*, *Staphylococcus aureus*, and *Streptococcus faecalis* Frozen in Simplified Food Substrates.** *Applied Microbiol.* Baltimore. 1960, Mar., v. 8, No. 2, 109–13, 1 fig.

Data were obtained on the number of viable cells surviving freezing, frozen storage and thawing from each of 3 bacterial genera responsible for food-borne illness.

4 substrates of single food ingredients were suspended in buffer. To each was added viable cells of a single species of *Salmonella typhi-murium* 84, *Staphylococcus aureus* 196 and *Streptococcus faecalis* R 26. Bacterial cells suspended in buffer or physiological saline were used as controls.

Periods of frozen storage extended through 10 weeks at −11°, −21° and −30°C.

The suspending media included 4% concentrations of waxy rice flour (cooked) corn syrup, egg white and sodium alginate in phosphate buffer. The addition of all these substances to phosphate buffer resulted in the maintenance of increased numbers of viable cells at each temperature and time. The extent of the effect for each ingredient differed with the organism, time and temperature. These differences were most marked with the sodium alginate medium.

Usually the greatest number of cells survived, at each time period, at the lowest temperature (−30°C.) and the least at the highest (−11°C.).

It is concluded that substances may be present in foods which give a high degree of protection against freezing damage to the cells of food poisoning strains of bacteria.

Betty C. Hobbs

Evans, F. R. & Curran, H. R. **Influence of Pre-heating, pH, and Holding Temperature upon Viability of Bacterial Spores stored for Long Periods in Buffer Substrates.** *J. Bacteriology.* 1960, Mar., v. 79, No. 3, 361–8, 12 figs. [20 refs.]

Observations were made on the influence of species and certain environmental factors upon the long term viability of commercially significant forms of sporing bacilli, including *Bacillus subtilis, B. brevis, B. macerans* (7069), *B. stearothermophilus* (1518), *Clostridium botulinum* (62A) and *Clostridium* spp. P.A. (3679).

The aerobic spores were produced on slopes of nutrient agar containing manganese, the clostridia in liver broth, suspensions were filtered through cotton, washed and stored at 3°C. Clumps were dispersed by shaking with glass beads and the suspensions in phosphate buffer were divided into two parts, one half was heated at 85°C. for 15 minutes, or 100°C. for 10 minutes, cooled and, together with the other half, stored in the dark at 0°, 30° and 37°C., or at 30°C. only. Viable spore counts were made of each buffer sample before and after prestorage heating and after varying periods of storage. Equal quantities of the buffer suspension were heated in skim milk at 85°C. for 15 minutes. Aerobes were counted in glucose nutrient agar containing starch, anaerobes in Prickett tubes containing pork infusion agar

with starch and $NaHCO_3$ and sealed with agar containing thioglycolate. Colony counts were made after 48 hours' incubation at the optimum temperature of the organism. In most instances pre-storage heat shock caused increased loss of viability during storage.

Spores of *Cl. botulinum* 62A and of P.A. 3679, in contrast to those of the aerobic species maintained their viability almost without change over a period of 3 years. The viability of the aerobes was maintained much longer at *p*H 8 than in the acid substrates. The rate of decline in the spore population was a function both of *p*H and of temperature.

Spores of different species varied widely in their susceptibility to prolonged environmental influences. Preheating of aerobic but not of anaerobic spores activates certain enzymes tending towards, but not achieving, germination with significant loss of dipicolonic acid. Cultures which grew most luxuriantly and produced spores in greatest abundance were most vulnerable to long-term external influences. *Betty C. Hobbs*

This bacterial flora was similar in oysters from ar area so that within the oysters the same organisms similar biochemical groupings, proteolytic and w saccharolytic, were found in all areas. The en mental flora, however, showed different degrees of s pollution and had been selected purposely for va water conditions. Therefore, the observed flora typical of the oyster rather than of the environme

The "commensal" flora of the oysters was anal to that found on free swimming fish and was com essentially of typical marine psychrophilic ba adapted physiologically to life within the n environment. The predominance of proteolytic ba and of types capable of fermenting glucose in the n flora of the oyster was concerned with the higher gl content of the oyster and may be of practicable s cance in post mortem spoilage. Thus the natural may be a major factor in spoilage, and metho prevention should take this into consideration.

Betty C. Ho

COLWELL, R. R. & LISTON, J. **Microbiology of Shellfish. Bacteriological Study of the Natural Flora of Pacific Oysters** (*Crassostrea gigas*). *Applied Microbiol.* Baltimore. 1960, Mar., v. 8, No. 2, 104–9, 2 figs. [22 refs.]

The bacterial flora of oysters held under approximately natural conditions was studied in 3 different areas of the State of Washington with a control held in the salt water aquarium at the College of Fisheries. Coliform counts were carried out to obtain information concerning the degree of pollution of the environment as well as of the oysters themselves. The proportion of coliform bacteria in oyster samples was never more than 0·5% of the total viable flora. Nevertheless, the oysters had concentrated coliform organisms from the sea water, which emphasized the public health significance of oysters as potential agents of enteric infection.

Gram-negative rods of *Pseudomonas/Vibrio* and *Flavobacterium* groups predominated. Gram-positive organisms constituted less than 20% of the isolations.

LAMANNA, C. & MEYERS, C. E. **Influence of Ing Foods on the Oral Toxicity in Mice of Cryst Botulinum Type A Toxin.** *J. Bacteriology.* Mar., v. 79, No. 3, 406–10.

Type A crystalline botulinum toxin (50,000 to 2 intraperitoneal LD50 proved equivalent to 1 LD5 *os*) was stored in citrate buffers (*p*H 3 to 5) cont 0·2% gelatin. For use the toxin was diluted in phate buffer, *p*H 6·3 to 6·5. Mice were given injections of 0·25 ml. quantities of reagents. Food toxin were given separately. The animals were obs for 5 days.

Commercial mouse pellet food, egg albumin and oil-pellet mixture increased toxic potency, while milk powder decreased potency. Tests with b showed that alcohol would have no prophylactic unless taken in enormous quantities.

It was concluded that quantitative statements o oral potency of botulinum toxin required knowled the kinds of foods consumed. *Betty C. Ho*

Mycoses and Mycology

The order of diseases and fungi in this section is:—**General; Dermatophytes; Blastomyces; Histoplasma, Sporotrichum, Phialophora; Candida, Cryptococcus; Actinomyces, Nocardia; Aspergillus; Others.**

Papers on Blastomycosis (South American type), Coccidioidomycosis, Mycetoma and Rhinosporidiosis are abstracted in the TROPICAL DISEASES BULLETIN.

SMITH, George. **An Introduction to Industrial Mycology.**

This book was reviewed on p. 835.

ROBINSON, H. M., Jr., ROBINSON, R. C. V., BERESTON, E. S., MANCHEY, L. L. & BELL, F. K. **Griseofulvin, Clinical and Experimental Studies.** *Arch. De* 1960, Jan., v. 81, No. 1, 66–76, 7 figs. [11 Discussion 76–80.

To provide a comparison in estimating the griseo content of blood when this drug was administered, samples were taken from a dog and known quantit

seofulvin were added to them. These samples were n extracted with butyl alcohol. Concentrations of 20 40 μgm. per ml. could thus be recovered from the od. However, attempts to extract griseofulvin *in vivo* m a dog dosed with griseofulvin were not successful. was, however, recovered from plasma and urine of nan subjects after oral administration.

The effect of griseofulvin on experimental infection h dermatophytes in guineapigs was not determined to satisfaction of the authors who were of the opinion t "the rapidity with which griseofulvin apparently cessfully eradicated the infection casts a doubt on the idity of these experiments"; and also that guineapigs re not suitable subjects to use for assessing the action this drug since there was a natural tendency in these mals for lesions due to dermatophytes to resolve ntaneously within a short period.

Clinical studies included observations on patients pre- ting with one or other of the various clinical types of ea while under treatment with griseofulvin. Although forms of tinea responded well to treatment with this g the most satisfactory results were obtained in the e of glabrous lesions. In many cases subjective nptoms ceased dramatically within a few days [a ture observed by many authors previously]. In ients presenting with tinea cruris it was possible to ain positive cultures until the time that all traces of lesions had disappeared. Likewise, in the case of ychomycosis it was possible to recover the fungus in ture until new nail growth was almost complete. nese findings may be taken as a warning to those who y solely on clinical appearances in assessing the results treatment by this drug.]

Various species of dermatophyte were investigated *in ro* for evidence of acquired resistance to griseofulvin, l preliminary results suggested that this could occur strains of *Microsporum canis, M. audouini* and *T. ntagrophytes.*

Toxicity studies did not reveal any abnormalities as a ult of oral administration of this drug.

C. J. La Touche

OLDMAN, L., SCHWARZ, J., PRESTON, R. H., BEYER, Amanda & LOUTZENHISER J. **Current Status of Griseofulvin. Report on One Hundred Seventy-Five Cases.** *J. Amer. Med. Ass.* 1960, Feb. 6, v. 172, No. 6, 532–8, 5 figs. [18 refs.]

The authors of this paper discuss, in general terms, e various aspects of oral griseofulvin therapy with rticular reference to their own experience in the ministration of this drug, and record in tabular form e main results which they obtained on treating 84 tients. They also discuss the results of applying this ug topically in 91 patients with one or other of the rieties of tinea. Details of dosage are given.

Response to orally administered griseofulvin was iformly good, especially in the case of tinea capitis, ea corporis and tinea cruris, the treatment proving ective after periods of 2 to 8 weeks. Longer periods of atment were required for the palms and soles in tinea dis and, in the case of onychomycosis, it was necessary to extend the period up to 4 and 6 months or even longer.

Some relapses occurred but were controlled with further treatment. There were no serious side-effects.

Topical application of preparations containing griseofulvin showed promising results but as these trials are still in progress the authors have postponed their definite conclusions regarding this form of administration.

C. J. La Touche

SMITH, Nadine G. **Petechial Reaction caused by Griseofulvin.** *Arch Dermat.* 1960, June, v. 81, No. 6, 981.

RUSSELL, B., FRAIN-BELL, W., STEVENSON, C. J., RIDDELL, R. W., DJAVAHISZWILI, N. & MORRISON, S. L. **Chronic Ringworm Infection of the Skin and Nails treated with Griseofulvin. Report of a Therapeutic Trial.** *Lancet,* 1960, May 28, 1141–7, 1 chart. [17 refs.]

A control trial was carried out to compare a group of patients suffering from chronic ringworm infection treated with griseofulvin for 4 months, with a group given an inactive preparation for the same length of time. Griseofulvin was administered orally in a dose of 1·5 gm. daily. Numbers in this trial were kept to a minimum by using a restricted sequential procedure. It was found that 31 of 33 treated patients showed definite clinical improvement compared with 1 of 31 control patients. Minor side-effects occurred equally commonly in both control and treated groups.

The 33 treated patients continued to take griseofulvin for periods ranging from 4 to 12 months. The control patients who had received dummy tablets for 4 months were then put on griseofulvin for periods of from 2½ to 8 months; in addition 11 other patients were followed up for one year. Clinical improvement of the skin lesions was noted in most instances by the 8th week. The appearances were usually normal by the 16th week and all skin lesions had abated by the 36th week.

By the 12th week almost all patients with fingernail lesions had improved but only 62% of patients with toenail lesions showed improvement in this time. By the 10th month 80% of patients with fingernail lesions had normal nails, but only 12% of those with toenail lesions. 6 out of 8 patients with affected fingernails were normal at the end of a year, but only 2 out of 11 with affected toenails.

By the 8th week of treatment 40% of patients with skin lesions (excluding toe web lesions) became mycologically negative compared with 22% of those with toe web infections. A diminution to the immediate positive reaction to the trichophytin test was observed during treatment in a limited number of patients. No side-effects were attributable to griseofulvin which was concluded to be a safe, effective remedy for chronic ringworm infection. It was, however, found that long-term treatment was necessary, particularly in the case of affected toenails.

H. T. H. Wilson

FERGUSSON, A. G., LOGAN, J. C. P. & DERBLAY, P. R. **Response of Favus to Griseofulvin.** [Memoranda.] *Brit. Med. J.* 1960, Apr. 2, 1026–7, 4 figs.

The authors of this report describe their experience in the oral treatment of 2 cases of favus with griseofulvin.

The first patient treated with this drug was a woman aged 38 years with a history of baldness of over 36 years. She presented with diffuse baldness and "crusting and scarring mainly round the sides of the scalp and on the occipital region, where typical yellowish scutula were also present". Under Wood's light bright green fluorescence was observed. *Trichophyton schönleini* was grown on culture of infected material. Griseofulvin was administered orally in the dosage of 0·75 gm. daily (15 mgm. per kgm. of body weight). At the end of 3 weeks loss of fluorescence was observed at the proximal end of the hair shafts. At the end of 5 weeks a clearance zone of 2·5 cm. was recorded in the proximal end of the hair shaft and this was still extending at the time of writing.

The second patient so treated was a girl aged 12 years, the daughter of the previously mentioned patient. She gave a history extending over 10 years of scaling of the scalp. She presented with crusting and scarring distributed uniformly over the vertex and occipital area and occurring in scattered patches in the frontal and parietal areas. Bright green fluorescence was also observed under Wood's light and again *T. schönleini* was grown in culture. She also received griseofulvin orally, and, as in the case of her mother, responded favourably, although at a somewhat slower rate. It was estimated that the progress of the fungal parasite had been arrested in her case at the end of 7 weeks. An interesting side effect of this treatment was the appearance of a maculopapular eruption on the dorsum of both feet during the second week of treatment. This was satisfactorily controlled with orally administered diphenhydramine hydrochloride (200 mgm. daily).

C. J. La Touche

CHAVERIAT, A., CLAVIE, L. C., ORUSCO, PELBOIS, F. & ROLLIER, R. La Griséofulvine dans le traitement des teignes et épidermomycoses. [**Griseofulvin in the Treament of Tinea and Epidermomycoses**] *Maroc Méd.* 1960, Jan., v. 39, No. 416, 74–81, 6 figs. [Numerous refs.]

After briefly surveying the literature on griseofulvin therapy of the dermatophytoses these authors record their experience in the oral administration of this drug to a number of patients suffering from one or other of the various clinical types of tinea.

One group of patients to whom this drug was administered included 45 cases of tinea capitis (of whom 3 were favus), 3 of onychomycosis, 5 of tinea pedis and 2 of tinea cruris, as well as several cases of generalized tinea due to *Trichophyton rubrum, T. violaceum* and *T. schönleini.*

For the tinea capitis cases a 100% clinical cure was claimed by these authors as a result of using this drug (60% cleared in 3 weeks and 40% in 25 to 28 days). These results were confirmed microscopically and by culture. Treatment of a second group of patients s ing from tinea capitis met with equal success.

All 3 cases of onychomycosis responded favourab this treatment but had not cleared at the time of w The treatment of cases of tinea pedis and of tinea was also satisfactory.

The cases of generalized tinea infection, which sented a type of tinea hitherto considered as incu also responded favourably to griseofulvin admini orally, but, owing to a shortage of the drug, cure not yet been effected.

The authors finally compare in general term therapeutic and economic aspects of griseofulvi X-ray treatments and reach the conclusion that th no longer any justification for the continuance of therapy, which entails a considerable staff which be released for other employment and which has sioned a considerable number of cases of radioderm and of defective hair growth. *C. J. La Tou*

BERRY, C. Z., SHAPIRO, S. I. & DAHLEN, R. F. **R rence of *Trichophyton rubrum* Infection d Treatment with Griseofulvin. Report of a** *Arch. Dermat.* 1960, June, v. 81, No. 6, 982.

UECKERT, Sonja & UECKERT, H. Über physiolog Wuchsformen bei Dermatophyten. [**On Ph logical Forms of Growth in Dermatoph** *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 178, N 236–49, 12 figs. [40 refs.]

The description of macroscopic colony characte of dermatophytes has always presented difficulties. a study of 48 isolates grown under standard cond the authors have attempted to standardize by lat tion a series of descriptive terms, most of which w familiar to students of the dermatophytes. They guish 2 main types of 'rough structure' [form] of c as 'planus' and 'tumulosus'—the latter sub-divid 'verrucosus', 'acuminatus', 'hemisphaericus', 'ce formis', 'radiatus', and 'crateriformis'—and 6 types of 'fine structure' [or texture] as 'granul 'lanosus', 'floccosus', 'funiculosus', 'velvetus', 'faviformis'. This nomenclature is illustrated by a of 12 figures of diverse dermatophytes to whic appropriate latin descriptions are given in the text. a colony of *Trichophyton schönleini* is designated briformis; faviformis, partim faviformis gypseus faviformis velvetus'. *G. C. Ainsw*

ENGLISH, Mary P. & GIBSON, Mary D. **Studies i Epidemiology of Tinea Pedis. III. Cross- tion in the Family.** *Brit. Med. J.* 1960. Ju 1860–62. [11 refs.]

In pursuance of their investigations into the epid logy of tinea pedis [this *Bulletin*, 1957, v. 32, 574; v. 35, 1004] the authors carried out a comparative s of "school families" and "clinic families" be December 1957 and May 1959. The school families

se of one senior boys' school and one senior girls' ool. Clinic families were those of patients referred the investigators by a dermatologist. Only infections to *Trichophyton mentagrophytes* var. *interdigitale* e considered. Scrapings for examination and culture e made from all members of the families under inves- tion irrespective of whether or not they presented h lesions.

Results showed a higher incidence of cross infection both school and clinic families in the higher social des than in the lower social grades and this was ught to be due to the more frequent use of bathing ilities made by the families in the higher social grades. s was also shown to be the case when data of a vious survey [1957, *loc. cit.*] of the spread of *T. rum* infection in families were compared. It was also wn that in both school and clinic families there was w incidence in groin infection and nail infection due *T. mentagrophytes* var. *interdigitale*.

A feature common to both school and clinic groups in present survey, and also reflected in the *T. rubrum* vey previously recorded, was the "high risk of infec- n run by offspring of 12 years or over who had been ught up in infected families". This was shown by a rcentage rate of infection of 50 or more. However, a rked difference between the school and clinic families s shown as regards the number of families in which ead of infection had actually occurred; thus, in the ool families, a single contact only had become ected in each of 3 families out of 22, whereas, in the ic families, infection had occurred in 8 families out 19 and in 4 of these 2 contacts in each family had come infected.

These results, considered as a whole, confirm earlier servations regarding the spread of tinea pedis in nilies recorded by these authors and others in Great tain but differ markedly from those obtained by estigators in the United States. *C. J. La Touche*

ARPLES, Mary J. & CHAPMAN, Eileen N. **Tinea Pedis in a Group of Schoolchildren.** Reprinted from *Brit. J. Dermat.* 1959, Dec., v. 71, No. 12, 413–21. [13 refs.]

The authors of this article investigated a group of 387 hoolchildren in Dunedin, New Zealand, during the ar 1957 in an endeavour to determine if participation swimming influenced the incidence of tinea pedis. eir ages lay between 11 years and 14 years. Possible luencing factors considered were: frequency of attend- ce at baths; participation of father in World War II; ndard of personal hygiene; *p*H of the skin in the toe fts; presence of other lesions such as chilblains, warts, ling, macerated skin, and fissures.

Scaling and maceration of the toe clefts were found 69·3% of the children. Pathogenic fungi were found 2·5% of children with normal skin in the toe clefts d in 7·5% of children with abnormal skin in the toe fts. No difference could be discerned between the es as regards incidence of tinea pedis. Of the fungi lated from the toe clefts *Trichophyton mentagro- ytes* was found most frequently, *Epidermophyton floccosum* and *Candida albicans* only once each, while *T. rubrum* was not isolated at all. The authors were unable to establish any correlation between the swimming habits, type of footwear, personal hygiene, *p*H of the skin of the toe cleft or participation by the father in military service and the presence of fungus in the toe clefts of the children.

The bacteriology of the toe clefts was also studied, and it was found that the incidence of coagulase negative staphylococcus was high whereas that of coagulase positive staphylococcus was low (in only 2·5% of the children).

From these results the authors conclude that abnormality of the skin is not necessarily associated with the presence of fungus and are of the opinion that a pathogenic staphylococcus may give rise to or exacerbate subjective symptoms associated with tinea pedis.

C. J. La Touche

LEVY-LEBHAR, G. & LEVY-LEBHAR, J. P. Roentgen-épilation du cuir chevelu dans le traitement des teignes. Conclusions après 18,000 irradiations dans une collectivité d'enfants marocains. [**X-ray Epilation of the Scalp in the Treatment of Ringworm. Results of Irradiation in 18,000 Moroccan Schoolchildren**] *Maroc Méd.* 1960, Jan., v. 39, No. 416, 82–4.

These authors claim to have perfected a safe and effective X-ray epilation therapy for ringworm of the scalp and thereby to have effected cures in some 18,000 Moroccan children during a period of about 10 years.

After describing the main features of the X-ray technique, they record a steady progress in the percentage of cures from 1950 (60%) to 1959 (99·3%), and the practical elimination of scalp ringworm in the groups so treated.

They conclude from their experience that X-ray therapy can be practised without risk, provided that certain conditions are observed. These are briefly: first, to avoid exceeding one or at most two administrations, and, should the necessity arise for a second treatment, to administer this only locally; second, to use only efficient and strictly controlled apparatus; and third, to modify the distribution of the different fields according to the shape of the head.

Despite their success in the practice of this form of therapy the authors concede that it entails many difficulties from the point of view of organizing and training executive personnel and feel that, with the advent of antibiotic treatment such as oral griseofulvin, X-ray therapy should be reserved only for specially resistant cases or for localized relapses. *C. J. La Touche*

MCDONOUGH, E. S., AJELLO, L., GEORG, Lucille K. & BRINKMAN, Sherry. *In Vitro* **Effects of Antibiotics on Yeast Phase of** *Blastomyces dermatitidis* **and other Fungi.** *J. Lab. & Clin. Med.* 1960, Jan., v. 55, No. 1, 116–19.

It was observed by the authors that, whereas the mycelial phase of strains of *Blastomyces dermatitidis*

grew well at room temperature in culture medium containing cycloheximide, duplicate tubes of this medium showed only minimal growth or none when inoculated with the yeast phase of this fungus and incubated at 37°C. These observations stimulated them to inquire further into this phenomenon. Results showed much variation among different strains in their ability to grow in medium containing cycloheximide, and that the majority of the strains investigated were more sensitive to this antibiotic substance at 37°C. than at room temperature. This applied also, but to a lesser degree, in the case of chloramphenicol. Similar tests carried out with other parasites showed that strains of *Histoplasma capsulatum*, and *Sporotrichum schenki* also showed this differential response, but to a lesser degree than strains of *B. dermatitidis*. This, however, was not the case with strains of *Paracoccidioides brasiliensis* (syn. *Blastomyces brasiliensis*) so far tested. *C. J. La Touche*

SALIBA, A., BEATTY, O. A. & PAKALNS, A. **A Study of Pulmonary Histoplasmosis with particular reference to Pneumoperitoneum Therapy.** *Amer. Rev. Respiratory Dis.* 1960, May, v. 81, No. 5, 709–14, 1 fig. [15 refs.]

The authors state that it is not uncommon in the United States for cavitated cases of histoplasmosis or other fungus diseases to be erroneously treated as pulmonary tuberculosis with a negative sputum. This paper reports 7 cases with cavitated histoplasmosis who were treated with pneumoperitoneum. 1 is reported in considerable detail. 1 patient had pulmonary tuberculosis in addition to the histoplasmosis. Unilateral or bilateral cavitation was present in each case. In 1 patient the cavities may have been closed temporarily but this was not confirmed by tomography at the time. In none of the 7 cases did permanent cavity closure follow the use of pneumoperitoneum, and they conclude that its use is of no value. *F. H. Young*

NOVÁK, E. K. Untersuchungen mit neuen und modifizierten Pilznährböden. [**Investigations with New and Modified Media for Fungi**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 179, No. 2, 238–40, 2 figs.

The English summary appended to the paper is as follows:—

"1. Candida albicans grows in the Vitéz-medium quicker and more intensively than in Sabouraud's glucose bouillon.

"2. In the preparation of the malt extract, both that from ground malt and 'diamalt', the hydrochloride treatment has favorable effects on the properties of the medium, so that the growth becomes enhanced and intensified. No turbidity of the nutrient occurs during storage or autoclaving."

BERNHARDT, Hannelore. Die Pilzarten des Sputums. [**Species of Fungi in Sputum**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 178, No 4, 515–22, 2 figs. [16 refs.]

Yeasts were detected in the sputum of 80% of a series of 300 patients examined. The results followed the now familiar pattern with *Candida albicans* occurrin approximately 50% of the positive cases, *C. tropica* 15%, *Saccharomyces fragilis* and *C. pseudotrop* in 8–10%, and *Torulopsis* spp. (including *T. glabra* fourth place. When the results were analysed acco to the diseases *C. albicans* occurred in 61% of pa with pulmonary tuberculosis, 58% for carcinoma, for lung diseases other than tuberculosis and 52% other conditions. No other obvious pattern was s because the number of different species associated these conditions was directly correlated with the nu of cases examined, *i.e.*, tuberculosis 20 patients, 7 cies; carcinoma 25, 8; lung disease other than t culosis, 65, 17; other conditions, 80, 16.

G. C. Ainswo

VIGNEC, A. J. **The Role of *Candida albicans* in Common Skin Disorders of Infancy and E Childhood.** *J. Pediatrics.* St. Louis. 1958, v. 53, No. 6, 692–703, 1 fig. [22 refs.]

A 2-year study involving observation of 1,447 in was conducted to ascertain the role of *Candida alb* in the common rashes of infancy and early childh The patients were infants and children in residenc the New York Foundling Hospital, and infants inclu those newborn and premature at St. Vincent's Hos New York City.

The presence of *Candida* was determined by smear and culture technique; smears being treated 10% carbol fuchsin, and declared positive when bl spores were observed. For culture purposes Niche medium was employed, although occasionally Sabou medium was used. There was no correlation bet sex and colour and recovery of *Candida* from the Age was important and infants under one month more severe rashes and a higher incidence of rashes tive for *Candida* than older infants. The organism recovered in 36·5% of infants with diaper rashes ar 43·3% of infants with rashes of other types. In a trol group of infants *Candida* was found in 10·2% cases. It seemed unlikely that all cases with di rashes with positive mycology were in fact exampl true invasion of the skin by *Candida*, and only 13 presented the clinical picture of cutaneous candid

51 infants showed positive oral cultures and 36 of these were regarded clinically as thrush. There no correlation between the vaginal cultures of mo and cultures of the skin, mouth and rectum of the born infants. Of 49 newborn infants tested, 10 sh at least one positive culture from either the skin or r swab, and 6 had at least one positive oral culture. other conditions such as eczema, seborrheic dermatit intertrigo, *Candida* was occasionally recovered. Ph cridine cream was used in treatment. It worked be severe diaper rashes giving a positive culture, but a from these cases it gave equally successful re whether the mycology was negative or positive. cream was used on 361 patients and none of showed any evidence of sensitivity to it.

H. T. H. Wils

MMERS, W. St. C. **Mucormycotic Granuloma possibly due to** *Basidiobolus ranarum*. *Brit. Med. J.* 1960, Apr. 30, 1331–3, 1 fig.

This report concerns a 13-year-old Dutch girl recently rived from Indonesia and on holiday in London. A mp in the skin, situated between the shoulder blades, d been noticed five months previously. The clinical atures of this lesion were indicative of fibroma or oma or possibly sarcoma, but biopsy revealed "fibro-granulomatous tissue containing occasional micro-scesses and a scattering of foreign-body giant cells". attered hyphae were present. They were characteristic those found in members of the Phycomycetes, being oad and usually lacking in septa. Thrombosed blood ssels were sought and located (thrombosis of blood vessels being a characteristic histopathological feature in mucormycosis).

Histological sections stained by haematoxylin and eosin revealed the hyphae stained in pale blue. The author recommends the periodic-acid-Schiff reaction stain, and also particularly, Grocott's modification of Gomori's methenamine (hexamine) silver-nitrate stain for obtaining well stained preparations of this fungus.

The author is of the opinion that the hyphae observed in the biopsy from this patient are possibly those of a Phycomycete known as *Basidiobolus ranarum* because of the close resemblance between this case and cases previously reported in Indonesia [this *Bulletin*, 1957, v. 32, 327] which were thought to be due to infection by this fungus (usually a saprophyte on the excreta of frogs).

C. J. La Touche

Communicable Diseases

The order in this section is:—**Tuberculosis; Venereal Diseases; General Infective Diseases; Other Communicable Diseases.**

For the bacteriology of these diseases see the section on Bacteriology below. For diseases conventionally regarded as tropical, readers are referred to the TROPICAL DISEASES BULLETIN.

TUBERCULOSIS

IETRICHSON, P. Tuberkulose i Forsvaret 1953–1956. [**Tuberculosis in the Norwegian Armed Forces 1953–1956**] *Nordisk Med.* 1960, June 30, v. 63, No. 26, 801–7. [24 refs.]

The English summary appended to the paper is as llows:—

"Over the period 1948—1952 there was a fall in the cidence of pulmonary tuberculosis in the Norwegian ervices. The relevant foreign literature is reviewed and ie difficulty is stressed of finding a reliable measure of ie incidence of pulmonary tuberculosis to compare one ountry with another and one period of time with nother.

"This investigation is based upon 1,353 notified cases f tuberculosis among Service men in Norway over the ears 1953—1956. In 305 of these, further investigation nowed that tuberculosis was not present. 254 were ound to have destructive pulmonary tuberculosis (cavi-es and/or tubercle bacilli in direct smears).

"The incidence of active tuberculosis of the lungs in ecruits on entrance is 1.0, 0.3, 0.5, 0.5 per thousand for ie years 1953 to 1956, as compared with 1.2, 0.8, 0.5 nd 0.2 per thousand among those in the Services. Both roups show a falling incidence.

"Early forms of tuberculosis (hilar adenitis, pleurisy) re decreasing and the risk of contagion in the Services eems at the present moment to be of little practical nportance.

"The distribution of cases is related to military rank and civilian status, to the branch of service, to the civilian profession and to the home district. About 80 per cent of the cases of destructive pulmonary tuberculosis were detected in persons previously assessed as free from pulmonary disease.

"The paper concludes with a discussion of the tuberculin test, which is routinely carried out in all personnel on entrance. Many of those who develop tuberculosis of the lungs during military Service are Pirquet positive on entrance."

MARCHAND, M., DUBRULLE, P. & POLLET, A. Résultats de dix ans de dépistage de la tuberculose pulmonaire par un service interentreprises. [**Results of 10 Years' Diagnosis of Pulmonary Tuberculosis by an Occupational Health Organization**] *Arch. Malad. Professionnelles.* Paris. 1960, Apr.-May, v. 21, Nos. 4/5, 189–94.

The experience of 10 years, 1948–57, in Lille is reviewed. Cooperation with employers has grown; in 1948 the service covered 60,000 employees in 4 centres and in 1957 the numbers had risen to 95,000 employees in 12 centres. During the 10 years 1,816 cases of active tuberculosis were found; 1,018 were in the early stages and 798 were more advanced and of long standing. Of the 560 persons with a history of tuberculosis 61 were found to have relapsed.

The prognosis for the persons with minimal lesions

who remain at work is discussed and the results obtained by other workers are quoted. The authors are of opinion that these persons should cease work to ensure an early and rapid recovery. 253 persons refused this advice or their doctors did not think it necessary for them to cease work. These were followed up for periods varying from 2 to 5 years with examinations at intervals of 3 months and 13% showed marked deterioration.

W. J. Mart'n

KOCH, A. B. P. W. **A Tuberculin Survey in Ghana in 1957.** *Tubercle.* 1960, Apr., v. 41, No. 2, 123–6, 1 fig.

The lack of reliable information about the prevalence of tuberculosis in Ghana prompted the author to organize a country-wide tuberculin survey and BCG vaccination programme.

The survey had to be limited to: (a) the nursing staff of hospitals and their families (testing and vaccination were already compulsory in all government hospitals); (b) other hospital staff and their families; (c) contacts of tuberculous patients.

The work was done in 5 months in 1957, and 7,400 persons were tested at 45 hospitals. 10% of these were nurses, 5% contacts and 85% other hospital personnel and families.

The Mantoux test was used with 10 TU of OT and read at 60–72 hours. The criterion of a positive reaction was induration of 6 mm. or more.

Only 6,453 persons returned for reading, of whom 55% were reactors. In males the reactor rate rose from 25% at 0–4 years to 40% at 10–14, 63% at 15–19 and 78% in those over 54 years. In females the rate at 0–4 years was 28%, at 10–14 40%, and thereafter it rose more slowly than in males and never reached the same height. Only 49% of females reacted compared with 60% of males.

In 4 coastal towns the percentage infected rose from 24 at 0–5 years to 69 at 20–24. In the northern regions the rates were 35 in infants and 65 in those aged 15–19, and in the forest belt although 24% of infants reacted the peak was not reached until age 35–44 years (62% compared with 76% in the coastal towns and 74% in the northern regions at this age). Geographical and economic reasons for these differences are given.

Only 16% of the nurses aged 15–19 years were reactors compared with 54% of the total tested at this age. At 20–24 years the rate in nurses was 79% and it remained above that of the whole group in the higher ages. These figures point to a good environment of the nurses in their homes before entering hospital and to the high rate of infection in the course of their duties. Despite this the morbidity rate among nurses is said to be very low.

The question of non-specific tuberculin sensitivity is discussed. Koch is of the opinion that its presence should not be inferred from the pattern of the tuberculin reactions but would be better sought by differential tests with tuberculins from other mycobacteria.

H. G. Calwell

WHITTAKER, J. S. **The Tuberculin Test and T culosis.** *Canadian Med. Ass. J.* 1960, Jun v. 82, No. 24, 1222–4.

This paper reports the results of skin testing patients in a Canadian tuberculosis sanatorium dur period of 12 months in 1958–1959. The Mantou was used with 1, 5 and 250 units of PPD, non-re to the 1st dose being tested with the 2nd and reactors to the 2nd with the 3rd. The criterion positive reaction was induration of 7 mm. or more hours.

Most of the patients were known to have or suspected of having pulmonary tuberculosis; their ranged from 4 to 88 years with 57·6% aged 20–49. persons were in the majority; a few were Negro or I American Indians.

The results were:

Dose	Size of reaction in mm.	Number	Perce
1 TU	over 31	1	
	21–30	8	
	11–20	126	5(
	7–10	78	31
5 TU	11–20	6	
	7–10	7	
250 TU	11–20	4	
	7–10	6	
	Negative	14	
		250	10(

It was seen that in the group of 213 patients reacted to 1 TU the percentage with active d increased as the degree of sensitivity decreased. patients with reactions over 21 mm. had tuberculosi only 5 (44·4%) had active disease. In those with tions of 11–20 mm. 120 of the 126 had tuberculosi the disease was active in 87·5%. In those with rea of 7–10 mm. 70 of 78 had tuberculosis and the d was active in 92·9%.

So far as the diagnosis of tuberculosis is concer was seen that the greater the degree of sensitivit greater is the likelihood of the patient having tub losis. The 9 patients with reactions over 21 mm. a tuberculosis, 95·2% of those with reactions over 11 had tuberculosis, active or inactive, and 89·7% of with reactions of 7–10 mm. were tuberculous.

In the group who reacted only to 5 TU 69·2% tuberculous, while only 20% of reactors only to 25 showed evidence of the disease.

Of the tuberculous patients 98·6% reacted to 5 and complete anergy to tuberculin was seen in o patient.

H. G. Calw

STAHLE, I. **Bronchography in Cases of Pulmo Tuberculosis. I. Bronchographic Findings ting to the Extent and Known Duration o Pulmonary Tuberculosis.** *Acta Tuberculosea dinavica.* 1960, v. 38, No. 2, 91–104, 4 figs. on & 1 graph. [16 refs.]. **II. The Importance o Chemotherapy given for the Healing of T culosis Bronchial Lesions.** *Ibid.*, 105–18, 5 gr [17 refs.]

I. The authors point out the difference between the ormation given by bronchoscopy and bronchography. onchoscopy gives the possibility of assessing the cen- l parts of the bronchial tree only, but says little or thing about conditions in the peripheral bronchi; ereas bronchography when the whole of the bronchial e on the examined side is properly filled affords good ssibilities of studying both the pathological states of e peripheral bronchi and the topography of the tuber- lous parenchymal changes.

In the detailed study of the occurrence of peripheral onchial changes CHADOURNE found changes in 87% all examined cases, and where the tuberculous process tended over more than 1 lobe in the lung, in 100%.

The authors report the findings from 623 broncho- aphies on patients with post-primary pulmonary tuber- losis. In 100% of the cases with changes extending er 1 lobe, and in 90% with lesser changes in the lung, onounced bronchial changes are found. The degree of verity of these bronchial changes is directly related to e duration of disease and the extent of the changes. otally destroyed segments in the lobe occur almost clusively in cases where the disease has lasted over 1 ar and where the changes extended over 1 lobe. verticula or contrast-filled depressions, which may be veral mm. deep, are occasionally observed. Two types n be distinguished; first, especially in the left main onchus, a "necklace" of small contrast-filled channels, hich after a few mm. end in a club-shaped accumula- on of contrast medium. These may be observed on onchoscopy, and repeated bronchoscopy shows these noles" disappearing in connexion with the return to rmal of the general picture of the mucous membrane, ough they may remain for years. This type of bron- ial change is as a rule caused by dilated ducts of ucous glands, but may possibly be conditioned by a rtly contrast-filled perforation channel from tuber- lous glands to the bronchus.

The second type consists of 1 or several diverticula, 4 mm. deep, tapering distally towards the parenchyma. s a rule they run towards an enlarged lymph gland in e lateral interlobar space between the lingula and the ferior-lobe bronchus on the left side. These are often used by a new perforation from the lymph gland to e bronchus. It is not possible to say, if these broncho- aphically demonstrable changes occur, whether bron- ial tuberculosis is active or healed.

The author reviews 27 cases of perforation of the mph glands into the bronchus, which were correlated ith bronchoscopically established perforations. In 22 her cases these changes were observed bronchographi- lly but for various reasons the perforations were not scovered with bronchoscopy. It is thus clear that tuber- ulous bronchial changes are very much commoner than as generally supposed.

II. It has been pointed out in many quarters that fferent types of healing occur when different antituber- ulous drugs are given. Without treatment, pulmonary nd bronchial tuberculosis heals with the connective ssue proliferation and secondary shrinking of the ffected lung areas, as well as stenosis in the peripheral ronchi in these areas. If streptomycin is administered, ven if combined with isoniazid, this natural course of healing is not prevented; in fact the shrinkage is prob- ably more pronounced. If isoniazid is given without streptomycin the connective tissue proliferation appears not to be so pronounced and the secondary shrinking of the parenchyma and the enlargement of the bronchi seem to be very much less marked. Bronchologists have pointed out that isoniazid frequently gives much more rapid and better healing, without residual broncho- scopically visible changes. Examination of resection specimens has shown that the same is the case in the peripheral bronchi.

In a series of 617 bronchographies it has been possible to divide the patients into 2 groups. 1 consists of those in which the isoniazid, but not streptomycin, had been administered before bronchography. The second group had been given streptomycin before bronchography, though practically all these had also had isoniazid. The streptomycin group comprised 334 cases and the isoni- azid alone group 283. On the evidence of these broncho- graphies it is concluded that early isoniazid treatment produces results recorded bronchographically as nega- tive in about 25% of cases. Early streptomycin, even with combined isoniazid, results in negative broncho- graphies only being obtained in 10% of the cases, and early prolonged treatment—more than 3 months—in cases not extending over more than 1 lobe, results in considerably better healing when isoniazid without strep- tomycin is given (35% negative bronchographies); whereas when streptomycin even in combination with isoniazid is given only 2% of negative bronchographies were obtained.

It is concluded that streptomycin results in consider- ably poorer healing in tuberculous bronchial processes than does isoniazid; and that streptomycin should be used with caution for future operations or other acute requirements. [This is a very valuable paper.]

F. H. Young

BERKSON, J., GOOD, C. A., CARR, D. T. & BRUWER, A. J. **Identification of "Positives" in Roentgeno- graphic Readings.** *Amer. Rev. Respiratory Dis.* 1960, May, v. 81, No. 5, 660–65 [21 refs.]

A number of investigations have been done into the reliability of readings of chest X-rays, and a biblio- graphy of these is appended. In this investigation the objective was limited to the designation of an X-ray as "positive" or "negative". "Positive" meaning the presence of a shadow indicating a pathologic condition of the lung; "negative" meaning the absence of such a shadow.

500 X-rays of the thorax were selected, of which it was decided that 98 showed a pathological condition, *i.e.*, were positive. The shadows were minimal in size, varying from 1 to 2·5 cm. in diameter. These were sub- mitted to 9 experts, of whom 5 were radiologists and 4 clinicians. The mean number of false negatives was 18·5%, and false positives 3·4%. There was consider- able variation among the observers: each of the 4 readers whose percentage was above the average had a percentage of false positives below the average, reflecting the fact that a tendency to "under-read" has, in general,

a dual effect. After a considerable lapse of time the same radiographs, though in stereoscopic form, were submitted to the same observers. The number of false negatives was now 14·9%, and false positives 2·5%. It is considered that the results show that the use of stereoscopic reading has a definite advantage in improving reliability over the use of single X-ray readings.

F. H. Young

STRANDGAARD, E. **In Which Cases does the Treatment of Pulmonary Tuberculosis Fail Nowadays?** *Acta Tuberculosea Scandinavica.* 1960, v. 38 Nos. 3/4, 313–24. [42 refs.]

"Among 378 patients with active pulmonary tuberculosis treated at the Skørping Sanatorium during the period 1957–1959, 21 died, 19 had to be discharged while sputum positive, and 28 developed a recurrence after previous treatment. These were partly very severe cases and partly patients whose mental peculiarities or diseases had rendered treatment difficult or impracticable.

"In this connection, the author discusses the difficulties of carrying through a correct chemotherapy, during a stay in hospital or sanatorium and especially on an out-patient basis. From the literature, chemical studies of the urine from patients on PAS medication are reported. These studies have disclosed that in actual fact a very large proportion of the patients do not observe the prescribed chemotherapy or do so to a very incomplete extent."

EAST AFRICA. **Comparative Trial of Isoniazid alone in Low and High Dosage and Isoniazid Plus PAS in the Treatment of Acute Pulmonary Tuberculosis in East Africans. A Co-operative Investigation in East African Hospitals and Laboratories with the collaboration of the British Medical Research Council.** *Tubercle.* 1960, Apr., v. 41, No. 2, 83–102. [32 refs.]

This trial was made on indigenous patients suffering from the severe type of acute pulmonary tuberculosis which is commonly seen in East Africa. It was carried out in 6 hospitals and 2 laboratories in Kenya, Tanganyika Territory and Uganda.

177 patients aged 15 years or over entered the trial in 6 months of 1957; all had newly diagnosed, untreated, acute and rapidly progressive bilateral pulmonary tuberculosis believed to be of recent origin, and positive sputa in which the tubercle bacilli were sensitive to the drugs used. After admission, treatment was allocated by reference to pre-arranged lists based on random sampling numbers. The chemotherapy was prescribed for 1 year in hospital.

After the exclusion of 65 patients for reasons stated there remained 112 for analysis as follows:

40 patients in group "H"—isoniazid 200 mgm. daily;
37 patients in group "HIP"—isoniazid 20 mgm./kgm. and pyridoxine 5 mgm./kgm. daily;
35 patients in group "IOPH"—isoniazid 200 mgm. and sodium PAS 10 gm. daily.

Differences in the sex distribution of the patien the 3 treatment groups were found not to have aff the comparison between them. The general conditi the patients and the extent of disease present reasonably similar in each group.

In the HIP group 1 patient had a hypersensitive tion, 1 became mentally confused and 2 had tran peripheral neuritis; in the IOPH group 1 patient h very severe hypersensitive reaction. There were 3 d in each of the H and HIP groups and 2 in the I group.

It was found necessary to change the treatment be of clinical or radiological deterioration in 5 of t and 6 of the HIP patients but in none of the I patients.

Patients in all groups made substantial progress; in low dosage of isoniazid improved least and receiving isoniazid and PAS improved most.

At the end of 6 months cultures became negati 39% of the H group, 53% of the HIP group and in of the IOPH group; the figures at 12 months were 67% and 84% respectively. At 12 months isoni resistant strains were found in 53%, 33% and respectively, and PAS-resistant strains were prese 4 of 5 cultures from the IOPH group.

"Isoniazid plus PAS was more effective than e regimen containing isoniazid alone, and should recommended in preference, at present, for patients severe disease." *H. G. Calw*

ALMEIDA, F. das N., DE CAMPOS, L. E. B., RODRIG F. C., DE OLIVEIRA, G. A., ABRANCHES, A. J MARTINS, Maria A. G. & VASCONCELOS, M. **Re tion of Toxicity of the High Doses of Isoniazi its Association with Glutamic Acid.** *Acta Tu culosea Scandinavica.* 1960, v. 38, No. 2, 168 3 graphs. [21 refs.]

Although a considerable amount of work was do demonstrate the reduction of high doses of isoniazi its association with glutamic acid in the early 1950s combination does not seem to have been gene employed in therapeutics. There is some evidence the association with pyridoxine in making the h doses of isoniazid better tolerated may result in a p inactivation of it.

31 patients with advanced pulmonary tuberculosis organisms resistant to the 3 standard drugs in no doses were selected. 20 mgm. isoniazid per kgm. weight was given to each of them for 5½ months patients were given isoniazid plus glutamic acid, an received isoniazid alone. Neuropathy occurred in of the 16 patients treated with isoniazid alone, b only 1 of the 15 treated with isoniazid and glut acid. The patients treated with the glutamic acid bination tended to gain more weight than the others also the weight gain was steadier. There was a gr reduction in the number of bacilli per c.c. of sputu the glutamic acid group compared with the ison group alone. Clinically the results were about the s though there was one remarkable case whose prog was greatly improved in the glutamic acid group. I

niazid group there were 9 patients worse or dead, ainst only 3 in the isoniazid/glutamic acid series. The sage of glutamic acid was 500 mgm. combined with ch 50 mgm. tablet of isoniazid made in one tablet.

F. H. Young

EEHY, T. F., Jr., FERGUS, E. M. & LEE, J. R. **Oxytetracycline and Isoniazid Combination as Original Treatment of Pulmonary Tuberculosis.** *Antibiotic Med.* New York. 1960, Apr. v. 7, No. 4, 249–52.

It is universally accepted that at least 2 antituberculous ugs must be used together in the treatment of pulonary tuberculosis, especially in moderately and far vanced cavitated disease in order to preserve sensivity of the organisms to drugs. PAS, though effective this respect, is often unacceptable because of secon-ry complications. This paper reports the study of a mbination of oxytetracycline and isoniazid as a bstitute.

The patients were given 250 mgm. of oxytetracycline times daily, and isoniazid 4 mgm./kgm. They were lected on the basis of consecutive admissions for a tal of 150 consecutive new treatment cases. 30 of these ere omitted for good reasons, leaving 120; of these 74 ere men and 46 women. 44% had minimal disease; % moderately advanced; and 13% far advanced. In patients the sputum was negative throughout. Of ose positive on culture at the beginning of the study e proportion positive steadily decreased month by onth, until only 16·4% were positive at the end of 6 onths when the oxytetracycline was discontinued, and nother additional drug, usually PAS, was given for a rther 2 months with the result that only 7·3% were sitive at the end of that time.

Radiologically, 15% showed no change, 87·5% mprovement, and 1·3% worsening. The improvement as greater in a higher proportion of women than in en [the figures in the table and in the text do not quite gree]. Unfavourable reactions occurred in 11 out of 75 en, and 13 out of 45 women. It was necessary to scontinue oxytetracycline permanently because of arrhoea in 2 patients only; in the remainder, diarrhoea pruritis ani were troublesome but finally were well ntrolled by temporarily discontinuing medication or escribing medication for symptom control.

In previous reports the oxytetracycline has been used high dosage—5–7 gm. daily, which were subsequently duced to 2 gm.; diarrhoea occurred in 40% of the ries receiving 2 gm. daily. In this report which employs gm. of oxytetracycline, diarrhoea occurred in 2·5% of atients sufficiently seriously to interfere with administation of the drug. This was chiefly in advanced cases. % experienced side effects which were overcome.

Unfortunately no mention is made of the sensitivity the bacilli to isoniazid during the course of the dministration of the drugs. The authors consider that xytetracycline 1 gm. daily with isoniazid 4 μgm./kgm. a useful and acceptable combination in the treatment active pulmonary tuberculosis. *F. H. Young*

SCHLOSS, J. & ISMAIL, Z. **Cycloserine and Isoniazid in Childhood Tuberculous Infections.** *Antibiotic Med.* New York. 1960, Apr., v. 7, No. 4, 244–8, 9 figs.

The authors point out that childhood tuberculosis does not always respond satisfactorily to the normal antituberculous antimicrobial drugs. This occurs especially in the glandular component with a primary complex. Cycloserine has been shown by EPSTEIN *et al* [see, for example, this *Bulletin,* 1957, v. 32, 846] to be an effective tuberculostatic agent in all types of adult patients, but reports on its use in children have been scanty.

This paper reports on 14 children aged from 5 months to 3 years. A table giving the clinical status etc. is appended. All but 1 had pulmonary disease, and 2 children had tuberculous meningitis. All received cycloserine in 15 mgm./kgm. in 2 divided doses, and isoniazid, 10 mgm./kgm. in 3 divided doses. Prednisone was administered to the 2 cases of tuberculous meningitis in doses of 1 mgm. per lb. of body weight daily, and corticotrophin, 40 units once weekly. The clinical and radiological evidence of response was good and there was no evidence of any toxic reactions. 2 cases are described in detail.

Cycloserine owes its effectiveness to 3 properties: (1) its small molecular weight allows easy penetration of the tuberculous tissues, (2) it is highly soluble in water, and (3) it is active in low concentrations (15 to 25 μgm./ml. of serum), hence it diffuses across membranes easily. The 2 cases of meningitis were advanced, and even after 1 week of therapy the results were so striking that the authors were encouraged to give the cycloserine to other children.

All 14 cases responded to the cycloserine and isoniazid combination therapy. They suggest that not only is it effective in resistant cases as a second line of defence but useful as a primary line of attack in all types of childhood tuberculosis, particularly tuberculous meningitis and lymphadenitis. This is an interesting contribution.

F. H. Young

LUNTZ, G. R. W. N. & AUSTIN, R. **New Stick Test for PAS in Urine. Report on Use of "Phenistix" and Problems of Long-Term Chemotherapy for Tuberculosis.** *Brit. Med. J.* 1960, June 4, 1679–84. [26 refs.]

Several methods have been described for determining the presence of PAS in urine, depending upon the colour produced with Ehrlich's reagent and others. This article describes the use of paper sticks impregnated with phenistix, which is a mixture containing ferric and magnesium salts plus cyclohexyl sulphaminic acid. In the presence of PAS the sticks turn pink or purple according to the amount present. Compared with DIXON'S test [this *Bulletin,* 1958, v. 33, 112] which only gives a positive result with a concentration of PAS in the urine of at least 50 mgm. per 100 cc., this test gives a colour change with a PAS content of about 12 mgm. per 100 cc.

The test becomes positive also if the patients are taking

aspirin or phenothiazine compounds. A preliminary test showed that about 7% of about 1,300 consecutive new patients were taking aspirin as shown by this test; so it is possible that a few positive reactions not due to PAS will be found.

In tests on 444 patients receiving PAS in hospital, 436 (98%) gave a positive phenistix result, and 8 (2%) were negative. It was found that nurses were not watching these patients taking their tablets.

705 tuberculous patients were examined who were receiving, or were supposed to be receiving, PAS in an out-patients' clinic in Birmingham. 34% were found to be defaulters; the details of age and sex of these are given. The longer the patients had been receiving the drug the greater was the likelihood that they would default, at any rate on some occasions. The reasons why patients failed to take their PAS are discussed. It is stated that a positive result will be obtained if the patients have been taking PAS within 10 to 18 hours before the test is undertaken. *F. H. Young*

FROSTAD, S. Påvisning av aminosalyl i ufortynnet urin. En enkel metode. [**Estimation of Para-Aminosalicyclic Acid in Undiluted Urine. A Simple Method**] *Nordisk Med.* 1960, May 12, v. 63, No. 19, 579–81, 3 figs. English summary (7 lines).

In 1959 the author began to use the ferric chloride method of RUIZ [*Tubercle,* 1957, v. 38, 152] for the determination of para-aminosalicylic acid in the urine in patients under treatment for tuberculosis. About 30 urine tests were carried out each day in the author's sanatorium in Oslo, in which 120–130 beds were available for the treatment of the disease. After a series of consistently negative results obtained with the urine of a particular patient a large stock of unconsumed drug was found in her locker. The other patients then became aware of the purpose of the investigation and next day several kilogrammes of unwanted para-aminosalicylic acid vanished down the drains. The Ruiz method was found to be too time-consuming for large-scale tests, and the author therefore developed a simplified modification which does not require the urine to be diluted. Large sheets of filter paper are soaked in 3% ferric chloride solution, dried, and cut into 1 x 10 cm. strips. To carry out a test a strip is dipped into the undiluted urine. The presence of para-aminosalicylic acid is indicated by the development of a voilet-blue colour, the intensity of which is proportional to the concentration of the drug. The reaction is positive down to 5 mgm. per 100 cc. In an addendum it is pointed out that a similar method had previously been described by TURNER [this *Bulletin,* 1959, v. 34, 1000]. *D. J. Bauer*

SNELLING, M. R. J., MCGLADDERY, H. M., LIM, G., KUMAR, J. K. & KOK SAU HOR. **Surgery at a Chest Hospital in Malaya.** *Tubercle.* 1960 Apr., v. 41, No. 2, 103–8.

This paper presents a picture of the conditions found in an under-developed country where tuberculosis is a serious problem and many patients require surge render them non-infectious and capable of returni a normal life.

During one year in 1958–59 291 thoracic opera were done as follows: lobectomy 56; segmental rese with lobectomy 94; pneumonectomy 35; thoraco 35; miscellaneous 24; cardiac 8; post-resectional tho plasty, 2nd stage thoracoplasty, and thoracotomy haemorrhage 39.

The total death rate was 4·8% made up of lobec 5%; segmental resection and lobectomy 2%, pneum tomy 20%; thoracoplasty 3%; miscellaneous 4%; ca nil.

Segmental resections where 2 segments or less removed were the safest and most satisfactory opera done. Details are given of the results of the va types of operation and the patients' pre-operative st

Some observations were made on blood loss d operation. There is an impression that the loss of following lung operations is noticeably greater in patients operated on in the tropics than in Euro patients undergoing the same types of operatio temperate climates. The authors feel that it woul unwise to undertake a resection of the lung unle least 5 pints of blood are available in case of neec

In this series of lung operations all patients received streptomycin, isoniazid and PAS for va periods of under 6 months to over 2 years. In t tuberculous patients treated by pneumonectomy mor was much higher in those who had been rece chemotherapy for more than 2 years.

Endobronchial disease is very common in Mala appears to respond favourably to Tebefen and PA *H. G. Calv*

ASPIN, J. & DAVID, J. D. P. **Sulphur Hexaflu Pneumoperitoneum.** *Tubercle.* 1960, Apr., v No. 2, 146–7.

Sulphur hexafluoride (SF_6) is a chemically iner which was found to maintain pneumoperitoneu experimental animals without toxic effects. SWALBA *al.* used it in 13 human patients in 1957 [*Amer. Tuberculosis,* 1957, v. 76, 1063; this *Bulletin,* 1958 (330)] and found that satisfactory elevation o diaphragm persisted for 5–7 weeks after each ref compared with 10 days when air was used. Mor there was a more constant volume of gas in the perit cavity and less fluctuation in the level of the diaph between refills.

The authors have used sulphur hexafluoride to 167 refills to 18 patients since June 1958 with r closely resembling those of the earlier workers tioned. There have been only 2 minor complica On one occasion a transient peritoneal effusion detected; it disappeared in a few weeks without a tion. On another occasion a small leakage of th into the tissues led to surgical emphysema which sisted for 6 days—a longer period than is usual an air leak.

Extreme care must be taken to deliver sulphur fluoride accurately into the peritoneal cavity, fo

abolism of this insoluble gas might have serious effects. should never be used for induction.

'The American experience, that with this gas refills ed not be given at shorter intervals than four or five eks, is fully confirmed. Exposure to radiation at reening and time spent at the clinic can be more than lved, to the satisfaction of patients and doctors alike."

H. G. Calwell

NES, A. **Tuberculous Meningitis since the Introduction of Isoniazid.** *Tubercle.* 1960, Apr., v. 41, No. 2, 117–22 [11 refs.]

In the period 1953–58 39 patients were admitted to an linburgh hospital with tuberculous meningitis, of nom 20 were male and 19 female. Their ages ranged om under 1 year to over 20.

15 of the patients were fully conscious on admission almost so, 20 were partially conscious and 4 were nconscious. Tubercle bacilli were recovered from the rebrospinal fluid in 36 cases and all cultures except 1 ere fully sensitive to streptomycin, isoniazid and PAS. ne exception showed primary streptomycin resistance.

Intrathecal streptomycin was used in the early years ut after 1956 only 2 patients received it. In all 26 atients were treated intrathecally of whom 6 died; 13 atients were not given intrathecal streptomycin and 1 these died. Both groups also received isoniazid and AS, and intra-muscular streptomycin was often given or a few weeks.

32 patients survived and were well at the time of eporting in early 1959. 5 of the 7 deaths occurred in ne first month of treatment and 4 were not directly due meningitis.

29 (91%) of the survivors were able to lead normal ves; of the other 3 survivors 1 has cortical atrophy, 1 mentally retarded and 1 was a mongol whose original ate is unchanged.

In this study the patients who were not given ntrathecal streptomycin fared as well as or even better nan those who were. The comparison of the 2 groups based on retrospective analysis without randomization f patients or therapy, but the results suggest that when onsciousness is only slightly or moderately impaired ntrathecal streptomycin is unnecessary. [See also this *Bulletin*, 1956, v. 31, 806, 1090; 1957, v. 32, 25, 26, 135, 46; 1958, v. 33, 115.]

H. G. Calwell

ORBER, J. **Treatment of Tuberculous Meningitis.** *Brit. Med. J.* 1960, Apr. 30, 1309–12, 2 figs.

This paper reports the results of treatment of 210 hildren admitted to the Children's Hospital in Sheffield etween 1947 and 1958. The first 82 children were reated by streptomycin alone; 30 (36%) of them are live now, but only 20 (24%) have no neurological equelae. The second series were treated with a combination of streptomycin with PAS [this *Bulletin*, 1954, . 29, 936]; the results were much better: 35 (73%) are live, and 30 (63%) have no neurological sequelae, but ll the improvements occurred in children who were onscious on admission.

The third series was started when isoniazid was introduced [*ibid.*, 1954, *loc. cit.*; 1956, v. 31, 806], and in this series isoniazid, streptomycin and PAS were used. 80 children were treated; 66 (83%) are alive, and 55 (69%) have no neurological sequelae. Normally only 10 injections of intrathecal streptomycin are given, but the author strongly disagrees with the idea that streptomycin is now unnecessary in the average case.

Further details are given of patients who were unconscious on admission. Under the isoniazid-streptomycin-PAS regime 16 children under 3 years old were treated; 8 (50%) are alive, but all have neurological sequelae. 9 children of 3 years or over were treated; 6 (67%) are alive, and 5 (55%) have no neurological sequelae.

Of recent years steroids have been given in addition to children who are unconscious on admission or under 1 year old. Duration of steroid treatment rarely exceeds 1 month. Intrathecal hydrocortisone is used in children with threatened or established spinal block. The current treatment is as follows:—

Current Treatment of Tuberculous Meningitis

	Systemic	Intrathecal
Specific treatment: Isoniazid	20 mgm./kgm. daily for 6 months or longer	Occasional: 20–50 mgm. per dose
Streptomycin	40 mgm./kgm. daily for 6 months or longer (maximum 1 gm. daily)	10 injections (more if necessary): 20–50 mgm. per dose
PAS	If well tolerated: up to 5 gm. daily	——
Adjuvant treatment: Cortisone (or other steroids)	1. In infants under 1 year of age 2. In all advanced cases for about 1 month	
Hydrocortisone	——	In threatened or established spinal block
Pyridoxine	40 mgm. daily	
Anticonvulsants	For 1–2 months	

[This is a very good paper which should be read *in extenso*.]

F. H. Young

VOLJAVEC, B. F. & CORPE, R. F. **The Influence of Corticosteroid Hormones in the Treatment of Tuberculous Meningitis in Negroes.** *Amer. Rev. Respiratory Dis.* 1960, Apr., v. 81, No. 4, 539–45. [18 refs.]

This paper compares the results of a series of patients treated with or without corticosteroids; the patients consisted of Negroes with tuberculous meningitis.

Only patients who had moderate or severe meningitis according to the classification by the Medical Research Council of Great Britain (1948) are included. They all received approximately the same antimicrobial treatment.

17 out of 33 received only the antimicrobial agents and 16 received also corticosteroids. There is little reason to think that patients in both groups were in any way different from each other. It was found that under the standard treatment alone 9 patients (52·9%) died, whereas when steroids were added only 3 (18·8%) died.

The various points of prognostic significance are discussed. A discussion is also provided on the theoretical background, explaining the usefulness of corticosteroid hormones in the treatment of tuberculous meningitis.

The authors consider that corticosteroid hormones have an inhibitory effect on fibroblasts, thereby preventing the fibrous organization of the fibrin-containing exudate. If the fibrous organization is inhibited, the body will mobilize its own repairing forces, which in turn will gradually resolve the exudate, restoring the normal dynamics. *F. H. Young*

DORMER, B. A. **Tuberculosis.** *South African Med. J.* 1960, Apr. 9, v. 34, No. 15, 291–4, 2 graphs. & 1 chart.

This is short and dogmatic, but none the worse for that; it is a paper presented at a South African Medical Congress The author emphasizes environmental stress, which includes poor food, housing, sanitation and hygiene, and prolonged physical effort. Mitigation of these stresses will lead to eventual disappearance of the disease. Housing has been taken seriously in South Africa, particularly for the non-European, and in the last 5 years' expenditure on housing has reached £10 million per annum.

BCG is useful even if it increases individual biological resistance by only 10–20%. Chemoprophylaxis with isoniazid is effective in babies born in hospital of tuberculous mothers, in hospital personnel and others in close contact with the disease.

The author gives an outline of treatment, and advocates isoniazid (15–20 mgm. per kgm. daily) for a year in tuberculin-positive children under 5 who show no X-ray evidence of the infection, and also in those who show calcification. He quotes figures which show that notifications of tuberculosis for non-Europeans numbered 35,996 in 1954, rising to 56,912 in 1958, and that the expenditure on tuberculosis rose from 16·8% of the total health vote in 1947–48 to 41·5% in 1959–60. [To spend almost half the health vote on tuberculosis indicates how seriously the problem is taken.]

Charles Wilcocks

JENSEN, K. A. **Remarks concerning BCG Vaccination and Prophylactic Treatment with Isonazid.** *Acta Tuberculosea Scandinavica.* 1960, v. 38, Nos. 3/4, 179–94, 1 fig. [26 refs.]

Tuberculosis mortality rates have been declining during this century in highly developed countries. The causes of the decline are complex, and the factors which favour this desirable situation may not persist indefinitely. It is therefore incumbent on those concerned with the control of tuberculosis to decide how best to us procedures which are at present available agains disease, such as vaccination, chemoprophylaxis an discovery, isolation and treatment of infectors.

The advantages of BCG vaccination are described complimentary reference to the trial in England b Medical Research Council [this *Bulletin,* 1956, v. 31 1960, v. 35, 253] and critical reference to the Ame trials reported by PALMER *et al.* [*Ibid.,* 1959, v. 34,

The arguments against vaccination include the o rence of 4 deaths following vaccination in Scandi and of regional adenitis. In Jensen's opinion, D vaccine has been more virulent than necessary. reducing the dose from 0·075 mgm. to 0·0375 mgm frequency of complications has decreased conside without any important decrease in the rate of vaccinal tuberculin conversion.

The most serious objection to BCG vaccination is with the declining incidence of tuberculosis the advantages may outweigh the advantages, and in tion the tuberculin test will lose its value for reve new cases of tuberculosis.

Prophylactic treatment with isoniazid is then discu Jensen refers at length to the United States P Health Service's tuberculosis prophylaxis trial [1958, v. 33, 455]. After 18–24 months' observati was found that prophylactic treatment with isoniazid reduced the number of extrapulmonary complicatio primary infection by 80%.

Jensen is doubtful of the success of a procedure w demands that isoniazid tablets be taken daily for a w year, as he does not think that the regimen woul followed without close control. He therefore re mends that the present BCG vaccination be conti in Denmark, along with group examinations in area high incidence, until the final results of the "hu experiments in the United States" are available.

H. G. Calw

STEWART, C. B. & BECKWITH, C. J. W. **Lack of Asso tion between Hypersensitivity and Immu following BCG Vaccination.** *Canadian Med. J.* 1960, July 2, v. 83, No. 1, 1–5, 1 fig.

Among the unsolved basic and practical prob connected with BCG vaccination is that of the rela ship between tuberculin sensitivity and immunity. T is clear evidence that these states can be dissociate experimental animals but it is not known whether dissociation may also occur in man.

The problem was considered by the authors as or a series of studies in a Canadian city. Some 8 medical students, nurses, family contacts and sch children were vaccinated with BCG since 1947 multiple puncture. Data are presented on 717 me students for the period 1947–1957. The post-vac tuberculin conversion rate to 1 or 10 or 250 TU of varied from 100% to 65%, and in the whole s 15·8% failed to react to both tests. When a stu failed to react to 250 TU he was revaccinated, and o 66 non-reactors who were revaccinated 40 (60·6%) verted after the 2nd vaccination but 26 still rema

egative Only a few converted after further revaccina-on, and in 1 case conversion did not occur even after ie 8th vaccination. It was considered most unlikely that ie same individual received an inactive vaccine on as any as 8 occasions.

It was therefore concluded that some 5% of students accinated repeatedly with BCG do not develop tuber-ilin sensitivity, no matter how definite the local accination reaction may be. The local reaction at the te of vaccination was found to be more acute and to eal more rapidly in most of those who failed to convert ian in those who converted, and the authors find it easonable to assume that the more rapid destruction f the BCG organisms and healing of the lesion indicate n increase in immunity which is not accompanied by ie development of tuberculin sensitivity.

To date there has been no difference in the incidence f tuberculosis in those vaccinated students who reacted o 10 TU and those who only reacted to 250 TU. Moreover the findings in the unvaccinated groups com-ared with those in the vaccinated group who reacted fter vaccination only to 250 TU, suggest that as far as ie incidence of tuberculosis is concerned some immunity ad developed even when the degree of post-vaccinal uberculin sensitivity was slight. *H. G. Calwell*

FELDMAN, W. H. **Avian Tubercle Bacilli and other Mycobacteria. Their Significance in the Eradication of Bovine Tuberculosis.** *Amer. Rev. Respiratory Dis.* 1960, May, v. 81, No. 5, 666–73. [24 refs.]

In the United States the campaign to eradicate bovine uberculosis began in 1917. In view of its immediate success it was hoped that complete eradication would in time become possible, but, during the last 15 years especially, the effectiveness of the programme has lessened.

The basis of the attack on bovine tuberculosis has been the tuberculin test. The author considers the effect of natural infections in bovine and other animals with tubercle bacilli, and the ability of other types of tubercle bacilli to infect heterologous hosts.

Reference is made to a reported case in which the owner of a herd of cattle repeatedly infected them until it was discovered that he himself had bovine tuberculosis. In addition, although they are normally resistant to it, cattle are occasionally infected with the human type of tubercle bacilli. A positive tuberculin test may result, but after the human source of infection has been removed the animal previously hypersensitive to tuberculin gradually loses its sensitivity.

The chances of infection of cattle by avian tubercle bacilli must be fairly common. In cattle the lesion is usually localized and relatively non-progressive, though 2 exceptions to this rule are reported and others referred to. Several anomalies associated with infection with avian tubercle bacilli are reported.

The so-called skin tuberculosis of cattle is widespread, occurring as single or multiple nodules in the same animal, and they may ulcerate. A positive tuberculin test is often found in this condition.

It is also possible that certain unclassified mycobacteria may give rise to a positive tuberculin test.

The authors conclude that until avian and human tubercle and possibly some other mycobacteria can be eradicated, a positive test not indicating infection of a serious kind in cattle may be found and valuable animals slaughtered unnecessarily. *F. H. Young*

VENEREAL DISEASES

BRITISH J. VENEREAL DIS. 1960, Mar., v. 36, No. 1, 1–58, illustrated. [Numerous refs.] **Meeting of International Union against the Venereal Diseases and the Treponematoses, London, October 1959.**

The General Assembly for 1959 of the International Union Against the Venereal Diseases and Treponematoses, known as the IUVDT, took place in London in October. This included a programme of papers read by various authors, as well as social functions and visits.

The first paper is the report of the Secretary General (pp. 2–3) submitted by G. A. CANAPERIA; he outlines the proceedings of the Conference in Stockholm in 1957 and tells of the activities of IUVDT to date. The medico-social problem of prostitution was considered and an account is given of a Regional European Conference held in Brussels in conjunction with the Belgian National League against Venereal Disease. An international study group on human trichomoniasis was set up. Two bulletins were issued regularly. Liaison has been established with United Nations agencies and other non-government organizations and with WHO, and the Union has been represented at 7 meetings of WHO and UNICEF. Efforts have been made to increase membership through personal contacts and correspondence, and India and Turkey have recently joined.

The second paper was read by T. GUTHE (pp. 4–6), and gives an account of IUVDT and WHO; starting from the League of Nations in 1919, IUVDT was one of the first in the field to collaborate with WHO (now there are 43 such); all these receive documentation on the programme and work of WHO: the Union has particular interest in legislation on venereal disease throughout the world and it is suggested that a scheme for teaching on venereal disease at graduate, post-graduate and public health levels should be undertaken, an international journal published and an International Year designated.

N. ACTON (pp. 7–9) spoke of programme opportunities for IUVDT. Organizational measures recommended include strengthening communications between the Union and other bodies, development of an informal link between them and increased public health facilities.

The spread of information by means of publications, consultants, current literature and films; exchange of experts, training in venereal disease and conferences all help to tackle the problem.

E. G. Clarke and C. Van Hyning (pp. 10–13) point out that the American Social Hygiene Council has stimulated vigilance, made more federal funds available, elicited more information by social research, distributed educational materials and increased international relationships.

The articles which follow are on the medical aspects of the diseases. B. Webster (pp. 14–17), speaks of cardiovascular syphilis which is becoming less common as a result of improved treatment, but still presents a problem: the answer is to detect the condition while it is still in the stage of uncomplicated aortitis; this can be done by careful, full examination of all cases of latent syphilis, adopting all available modern methods. Treatment with penicillin and good cardiac management will arrest the disease if applied early.

H. Reiter (pp. 18–20), gives an account of the treponeme which bears his name. The treponeme was inoculated into rabbits and a specific antigen made from the organisms. The vaccine made with them brought about considerable improvement in a number of cases of paralysis. The media for culture are solid or fluid; the former consists of horse serum and rabbit liver or kidney heated for coagulation; the latter of rabbit serum and rabbit or guineapig brain, the whole being sealed with paraffin.

P. Durel, V. Roiron, A. Siboulet and L. J. Borel (pp. 21–26) describe the systemic treatment of trichomoniasis with a derivative of nitro-imidazole known as 8823 R.P.: this substance is of low toxicity, is active *in vitro* and *in vivo* and is found in serum and urine after oral administration. 13 male patients were given 250 mgm. twice daily for 10 days; all were improved; 1 relapsed but was cured by a second course, and in 2 the discharge persisted though trichomonads disappeared in all; 5 case histories are given. Of 6 women 5 were cured by oral administration only, but oral should be combined with local treatment; with mixed treatment 17 out of 21 were apparently cured. Equally good results were obtained in a series of patients in Canada but it is too early to arrive at a definite conclusion.

R. D. Catterall (pp. 27–29), investigated 222 patients suffering from uveitis in connexion with arthritis and non-specific genital infection: 142 (64%) had prostatis, 52 (23%) Reiter's disease, 29 (13%) ankylosing spondylitis, 14 (6%) atypical sacro-iliitis and 7 (3%) plantar fasciitis. Most of these were found to have anterior uveitis but only a few the posterior form. No causative organism could be incriminated by bacteriological or serological investigations. It seems clear that prostato-vesiculitis is a common factor of the syndrome.

W. J. Brown (pp. 30–33) spoke of reactions to penicillin; these appear to have increased, the reaction rate being 9·96 per 1,000 patients treated in 1959 compared with 5·95 in 1954 (in 2 surveys in U.S.A.). This, however, may be more apparent than real, since in the 1959 survey observation was probably closer and the total dosage (for gonorrhoea) considerably increased. Naturally the highest incidence was in patients treated for syphilis, since the reaction rate tends to increas total dosage rises. Reactions were classified as urtic anaphylaxis, serum sickness and others. The incid of reactions was highest in white females and lowe Negro males and tended to increase with age; no de were reported in either series. The author concl that there is no cause for alarm nor need pr methods be modified.

A. J. King (pp. 34–35) discussed penicillin resist in gonorrhoea. He stressed that resistant strains w be more accurately described as "insensitive" "partially resistant". As a general rule, stepping dosage will get over the difficulty; it would be desi to find a preparation which would ensure a blood of not less than 1 unit per ml. for not less than 24 h [this *Bulletin*, 1958, v. 33, 1041]. However, much rese is necessary before the problem can be solved and much stress cannot be laid on proper bacteriolo control of the diagnosis.

J. A. H. Hancock (pp. 36–39) spoke of surface m festations of Reiter's disease in the male; an investiga of 76 patients disclosed eye involvement in 45%, bala circinata in 26%, mouth lesions in 10% and keratode in 7·8%; the largest number of patients were in the 2 age-group. Of the 76 patients all had urogenital i tion and 97·3% had arthritis. 10 coloured plates s various lesions beautifully reproduced.

E. M. C. Dunlop (pp. 40–43) assessed the incidenc syphilis and yaws in 856 coloured immigrants in the End of London; of 128 with treponemal disease this 6% for coloured men compared with 1·3% for w men; for women the figures were 33·1 and 2·3%. were due to yaws, 26 to syphilis, 10 to both and i no decision could be made. It is of interest that little early syphilis was introduced into the U.K. that infectious syphilis occurred in patients who suffered from yaws.

C. S. Nicol, M. Brinton, G. S. Bird and M. S. Ric (pp. 44–48) investigated the social status and sex h of 429 coloured immigrants attending St. Thor Hospital, London. There were 297 males and females; the diagnoses were: syphilis 74 (early 13, 60 and congenital 1), yaws 44, gonorrhoea 161, gonococcal infections 140, other venereal diseases 4 other conditions 100 (94 had a double diagnosis). came from Jamaica and rather more than half doing unskilled jobs; marital status was much the as in the U.K.; most men left their families behind; of the males and 78% of the females were living furnished room; of the men 47% associated coloured women, 32% with white women, and 19% both; very few of the coloured women associated white men.

W. J. Brown (pp. 49–58), discussed migration factor in the venereal disease programmes in the U This rather wordy article stresses the (obvious) that movements of population spread venereal dis World War II provided an opportunity for mass b testing and thus finding many cases of syphilis; annual migration of large numbers of Mexican wo into the U.S.A. provided another. The author tri show that movements of population should not b

surmountable problem but should provide an opportunity for the control of venereal disease. There are 8 gures, 2 of which show venepuncture being carried out with the patient *standing!*]. *T. E. Osmond*

ARISH, D. J. & MITCHELL, J. R. A. **Syphilitic Paroxysmal Cold Haemoglobinuria. Case Report and Study of the Coombs Test.** *J. Clin. Path.* 1960, May, v. 13, No. 3, 237–40.

"A case of congenital syphilis which presented with aroxymal cold haemoglobinuria is described.

"The patient had aortic incompetence, and the signifiance of this finding is discussed.

"The Coombs test was studied, and positive results ppear to be due to interaction between antiglobulin erum and complement adsorbed on to the test cells, this dsorption being promoted by the cold antibodies."

ORENTZ, K. Die Mesaortitis luica in heutiger Sicht. [**The Present-Day Position of Syphilitic Aortitis**] *Deut. med. Woch.* 1960, June 10, v. 85, No. 24, 1038–41, 1053, 1079, 3 figs. on pl. [Numerous refs.]

In this short paper the author draws attention to the terature on the late manifestations of syphilitic infecons, the incidence of which is still considerable and not s small as was at one time supposed. Particular eference is made to syphilitic aortitis, and an account is iven of 27 cases of this condition diagnosed in the last years at the Medical Clinic of the Free University in erlin. The diagnosis of the disease is based on linical, X-ray and serological findings and is fully iscussed.

This group of patients consisted of 11 women and 16 ien whose ages ranged from 54 to 80 years. There is a able which sets out the signs and symptoms on which ie diagnosis was sub-divided into (1) uncomplicated yphilitic aortitis (12 cases), (2) aortitis with aortic valve efect (5 cases) and (3) aortitis with aneurysm (10 cases).

The therapy of these conditions is given a considerable escription.

The prognosis of uncomplicated syphilitic aortitis is ated to be good, but published records of other bservors are to the effect that if aortic insufficiency is resent there is a survival time of 48 months after iagnosis [this *Bulletin*, 1957, v. 32, 435], and if aneurysm present the period of survival ranges from 6 to 20 onths. *M. E. Delafield*

ILLOT, J., DUPOUEY, P. & FAURE, M. Composition antigénique des tréponèmes. II. Étude de la réaction croisée tréponème pâle-tréponème Reiter à l'aide de la réaction de fixation du complément et de la précipitation en milieu gélifié. [**Antigenic Constitution of *Treponema*. II. Cross Reactions between *Treponema pallidum* and Reiter's *Treponema* in Complement Fixation Reactions and Gel Precipitation**] *Ann. Inst. Pasteur.* 1960, May, v. 98, No. 5, 734–47, 9 figs. [15 refs.]

This is a long and highly technical article and will be of interest chiefly to serologists. Both *Treponema pallidum* (TP) and the Reiter treponema possess 3 antigens: a thermolabile protein, a thermostable polysaccharide and a lipoid; consequently a syphilitic serum will react with Reiter antigen and an anti-Reiter serum with TP antigen (cross-reaction). Syphilitic sera only react with the protein fraction of Reiter and not with the polysaccharide one.

These authors used 3 antigens (Reiter): (1) whole spirochaete treated by ultrasonic methods (2) protein extract (3) polysaccharide extract, and use them in complement-fixation and precipitation tests on sera from human beings, rabbits and guineapigs; these last 2 were immunized against the Reiter spirochaete. For one experiment antigens and immune sera were precipitated in a gel medium. The two types of experiment gave similar results. Results showed that antigens made from whole *T. pallidum* and the protein fraction of Reiter agreed closely (95–98%) in sensitivity and specificity; the Reiter protein purified but unaltered makes a reliable antigen, but a non-purified one possessing high antigenic titre and deprived of anticomplementary activity, yields results as specific as the purified protein.

[For Part I, see this *Bulletin*, 1959, v. 34, 680.]

T. E. Osmond

DEACON, W. E. & FREEMAN, Elizabeth M. **Fluorescent Treponemal Antibody Studies.** *J. Investigative Dermat.* 1960, Apr., v. 34, No. 4, 249–53, 5 figs.

The direct fluorescent antibody reaction consists of preparing a highly specific antiserum in an appropriate animal and conjugating the gamma globulin with fluorescein; the indirect reaction is in 2 stages: first the pathogen is treated with a specific unlabelled antiserum (*e.g.* rabbit serum); then after washing to remove unreacted serum, goat anti-rabbit globulin labelled with fluorescein is applied to detect rabbit antibody. The Fluorescent Treponemal Antibody (FTA) is an example of the indirect reaction and is carried out by placing treponemes from an infected rabbit on a microscope slide, drying, fixing with acetone and then exposing to the human sera to be tested: after washing with saline anti-human globulin labelled with fluorescein (the indicator) is added.

Treponemes which have coupled with human antibody will couple with the fluorescein conjugate and are shown up with an ultra-violet light microscope.

Results show that: in 346 normal serum specimens TPI was reactive in 1·7–5·5% compared with 1·5% FTA; the corresponding figures in 83 diseases other than syphilis were 9–13% and 7%; in 130 untreated primary syphilis 20–50% and 60%; in 51 treated early syphilis 27–53% and 30%; in 29 leprosy 0–3% and 0%. It seems probable that antibodies detected by FTA are the same as or similar to those detected by TPI.

Normal testicular tissue may serve as a source of non-specific reactivity; absorption of reactive serum with VDRL antigen removes the reactivity with several serum tests for syphilis but leaves reactivity with FTA and TPI tests. *T. E. Osmond*

DEACON, W. E., FREEMAN, Elizabeth M. & HARRIS, A. **Fluorescent Treponemal Antibody Test. Modification based on Quantitation (FTA–200).** *Proc. Soc. Exper. Biol. & Med.* 1960, Apr., v. 103, No. 4, 827–9.

A modification of the fluorescent treponemal antibody (FTA) test [this *Bulletin,* 1958, v. 33, 461] is described. This consists of using sera in a dilution of 1/200 (FTA 200). Horse anti-human-globulin labelled with fluorescein was used as the treponemal antibody indicator; the conjugate was diluted 1/80 in phosphate buffered saline, *p*H 7·2 containing 2% Tween 80. If weak reactions are neglected there is almost complete agreement between FTA-200 and comparative test procedures including TPI, Reiter treponeme and VDRL, as shown in table I; in general there was closer agreement when titres were high than when they were low.

It was found that the FTA-200 was considerably more reproducible than the FTA. *T. E. Osmond*

VAISMAN, A. & HAMELIN, A. Nouvelle technique de sérodiagnostic de la syphilis: réaction rapide de floculation des réagines du plasma. [**A New Technique for Syphilis Diagnosis. Rapid Flocculat Test of Plasma Reagins**] *Ann. Inst. Pasteur.* 1 May, v. 98, No. 5, 766–8.

These authors compared the rapid plasma reagin (RPR) [this *Bulletin,* 1958, v. 33, 226] with the Kol Wassermann, Denmanche Wassermann, Kline, Kahn VDRL, using the TPI as the standard.

The antigen was prepared from the ordinary VD suspension and centrifuged at 2,000 r.p.m. for 15 utes; the precipitate was taken up in an equal volum a hydrochloride solution of choline hydrochloride containing thiomersal resuspended and kept at + 4 for up to 1 month. The hydrochloride solution is pared by taking 1·33 cc. of 1% thiomersal in sa and making up to 100 cc. with 0·85% saline; t volumes of this 1 volume of 40% choline hydrochlo in saline is added. Plasma is prepared by taking bl into an anticoagulant and decanting after sedimentat

The test is carried out on a slide like the VDRL. specimens were tested; of these positive results obtained as follows: TPI 52·89%, RPR plasma 47·4 WR 33·69%, and flocculation tests 38·4%. Thus R agreed most closely with TPI; RPR and the other t each gave up to 5 positive reactions when TPI negative. RPR with plasma gave 131 reactions, fresh serum 116 and with inactivated serum only 97 *T. E. Osmon*

GENERAL INFECTIVE DISEASES

The order in this section is:—**General; Hospital and Other Cross Infections; Coccal Infections; Bacterial Infections; Virus Infections.**

GENERAL

DISNEY, M. E., SANDIFORD, B. R., CRAGG, J. & WOLFF, Jill. **Epidemic Bronchiolitis in Infants.** *Brit. Med. J.* 1960, May 7, 1407–11, 1 chart. [15 refs.]

Two outbreaks of epidemic bronchiolitis in infants occurring in successive winters in Birmingham are described; the term is synonymous with bronchopneumonia in the young infant and excludes staphylococcal pneumonia. Of the 325 cases, 118 (36·1%) required oxygen therapy, and there were 13 deaths (4·0%). In a large proportion of the cases there was a history of contact with upper respiratory infection in the family group. Epidemiologically and otherwise the facts suggest a viral aetiology, but little evidence was obtained of specific virus infection; the available techniques, however, did not include assessment of infection with the 'cold' group of viruses. The incidence of bacterial infection or superinfection was not high; at necropsy *Staphylococcus aureus* was isolated from 3 out of 11 cases, but only 1 had a true staphylococcal pneumonia, and no other pathogenic bacteria were isolated from the lungs. Moreover, antibiotic treatment was not very helpful, and the side effects, such as vomiting and diarrhoea, could have induced dangerous dehydration.

The symptoms of bronchiolitis appear to be due to blocking of the smaller bronchi with mucus; this l to anoxia of the pulmonary epithelium and pulmo oedema as well as to lobular collapse. All the sympt which preceded death, including fever, lethargy, co hyperirritability, tremors, and convulsions, may explained by anoxia, possibly combined with dehy tion. It is thought that the treatment of anoxia replacement of fluid are more important than antibio although the latter must be promptly used when the any reason to suspect staphylococcal pneumonia or o superadded bacterial infection. [A fair, though sp lative, inference from this paper is that this dange condition in young infants may be a manifestation of common cold.] *H. Stanley Ban*

FINKEL, K. C. & HAWORTH, J. C. **Clinical Tria assess the Effectiveness of Gamma-Globulin Acute Infections in Young Children.** *Pedia* Springfield, Ill. 1960, May, v. 25, No. 5, P 798–806. [20 refs.]

It has been suggested, on the basis of uncontr studies, that administration of gamma globulin is b ficial to patients suffering from severe or repe

bacteriological infections not responding satisfactorily to antibiotics [this *Bulletin,* 1957, v. 32, 1090]. This controlled clinical trial, on 102 children under 2 years of age suffering from various acute non-contagious infections, *e.g.* acute otitis media, upper respiratory tract infection, and pneumonia, does not confirm such a view.

The patients were divided by random selection into 3 treatment groups: (1) receiving 0·2 ml./lb. gamma globulin, (2) receiving half this dosage, and (3) receiving no gamma globulin. All 3 groups were treated with antibiotics as determined by the physician-in-charge. The 3 groups were reasonably comparable in respect of age, sex, length of illness, and diagnosis. The administration of gamma globulin to groups (1) and (2) did not affect the time taken to recover, as compared with that of the control group (3).

Certain additional facts were noted. The presence of physiological hypogammaglobulinaemia in the early months of life was confirmed, and a steady increase in level of gamma globulin was demonstrated with increasing age, generally up to 2 years [*ibid.,* 1956, v. 31, 596]. As was expected, patients with severe infections recovered more slowly than those with mild infections, but no correlation was found between the recovery time, the age of the patient, and the initial level of gamma globulin. Finally, in the children aged 13–24 months, there was a statistically significant correlation between the initial level of gamma globulin and a history of previous infections. *H. Stanley Banks*

ORDWAY, N. K. **Diarrhoreal Disease and its Control.** *Bull. World Health Organization.* Geneva. 1960, v. 23, No. 1, 73–101, 6 figs. [Numerous refs.]

Diarrhoeal diseases are the most important cause of infant and child mortality throughout the world, particularly where there is crowding, poverty and malnutrition. Though infectious agents are believed to be mainly responsible, causative bacteria have not been found in two-thirds of cases. Viruses have been occasionally incriminated but their importance is still doubtful. The peak incidence is in summer, except in a sanitary environment when it is during the cold weather possibly because the organism survives better then. The presence or otherwise of diarrhoea depends on the size of the infecting dose and on other epidemiological factors such as age, malnutrition and socio-economic status.

Control depends on good water supplies, sanitary disposal methods and insect control. Sanitary improvements alone do not lower the incidence of diarrhoea though each has been shown individually to be associated with a decline in prevalence, as has also breast-feeding. Health education and a better way of living are necessary. Adequate quantity and proximity of water supply are more important than high quality. There is no safe immuno- or chemoprophylactic. Treatment is a matter of restoration and maintenance of fluid and electrolytes and the reduction of abnormal fluid loss. Intravenous administration of fluid is most effective, but hypodermoclysis and slow intragastric drip through a gastro-nasal tube are simpler and satisfactory. Treatment is described and discussed and it is pointed out that elimination of the infecting organism does not greatly alter the patient's condition, but treatment of all persons, sick and well, in an institution will control an outbreak due to *Shigella* or *Escherichia coli.* Barrier nursing is of paramount importance.

In some areas insufficiency of hospital beds has necessitated out-patient treatment for children with diarrhoea. "Semi-ambulatory" centres treat the child for up to two days and it is then discharged or admitted. In other areas the sick child is rehydrated and sent home with electrolyte solution for further treatment. The difficulties of out-patient treatment for diarrhoeic children are inadequacy of personnel and follow-up, and ignorance causing resistance to better ways of living.

[The whole problem of diarrhoea of infants and children is thoroughly discussed in this valuable paper.]

T. H. Davey

HOSPITAL AND OTHER CROSS INFECTIONS

AMERICAN J. PUB. HEALTH. 1960, Apr., v. 50, No. 4, 468–503, 16 figs. [33 refs.] **Environmental Aspects of Staphylococcal Infections acquired in Hospitals.**

These 5 papers were presented at a meeting of the American Public Health Association, held in October 1959.

J. C. COLBECK (*The Hospital Environment—Its place in the Hospital Staphylococcus Infections Problem,* pp. 468–473) draws attention to a number of observations that indicate the importance of environmental contamination in spreading staphylococcal infection in hospitals. He stresses the mattress as a commonly ignored reservoir. Indirect contact infection is regarded as more important than direct aerial spread. A number of experiments suggest that staphylococci that have survived in dust do not lose virulence [but the experiments are not reported in any great detail].

H. M. GEZON, K. D. ROGERS, D. J. THOMPSON and T. F. HATCH (*Some Controversial Aspects in the Epidemiology of Hospital Nursery Staphylococcal Infections,* pp. 473–484) set up a series of 8 "hypotheses" and then report experience indicating that each was untenable. Even in the absence of any change in control practice there were great variations in the incidence of disease, so that changes observed could not be attributed to alterations in technique. Nurses do not constantly carry the same phage type of staphylococcus and are not commonly the source of the infants' strains. Uninfected infants nursed close to infected infants did not acquire infection more readily than those nursed at a distance from infected infants, nor did doubling the space per infant have a detectable effect. No specially active dispersers could be found among the infants. Greatly increased aseptic care did not reduce infection. The reason for failure to demonstrate any clear differences in these experiments was not discovered.

R. BLOWERS and K. R. WALLACE (*Ventilation of Operating Rooms—Bacteriological Investigations,* pp.

484–490) present a refreshing summary of the evidence for the existence of airborne infection in the operating rooms and suggest that sepsis is often common when the general bacterial count is of the order of 20–50 per cu. ft. and low when it is 1–2. Air sampling during operations shows that the air count can be reduced both by improved ventilation and by improved behaviour, and both are needed to get really satisfactory conditions. To clear the air of bacteria artificially dispersed into it, a downward displacement ventilation system has considerable advantages, but it is not yet clear whether this holds for continuous bacterial dispersal, as must happen during operating.

L. B. Hall and H. M. Decker (*Procedures Applicable to Sampling of the Environment for Hospital Use,* pp. 491–496) give practically all their space to a description of apparatus for collecting bacteria from the air; various forms of slit sampler are preferred. There is no discussion of the interpretation of the results obtained.

Maragaret W. Thomas (*Nursing Procedures in the Management of Staphylococcal Infections,* pp. 497–503) stresses the need for precise description in recommendations for asceptic nursing procedures and recounts the depressing degradations of aseptic regulations observed in a number of hospitals in which a survey was conducted to discover the best current methods.

R. E. O. Williams

Gardner, Audrey W. & Pope, K. G. *Staphylococcus aureus* **from Air-Borne Fibres in a Hospital Ward.** *Med. J. Australia.* 1960, Jan. 23, v. 1, No. 4, 127–9.

Dust was collected from the air at 3½ ft. from the floor of a ward in a hospital in Australia by suction through a Terylene filter. The dust was scraped off the filter, weighed and a portion then suspended in saline which was plated on nutrient media. Another portion of the dust was examined by Pressley's straining method [this *Bulletin,* 1959, v. 34, 149]; 93 to 99% of the fibres were found to be cellulose. The total bacterial count was about 3,700 colonies per mgm. dust. A total of 95 coagulase-positive staphylococci were found among 1,171 strains examined. It is concluded that the airborne bacteria, including *Staph. aureus,* in the ward air were contained in the cotton fibres, and that dust-laying methods for cotton are urgently needed. [There is however, no direct evidence that the bacteria were in any way attached to the fibres while they were still present in the air of the ward.] *R. E. O. Williams*

Pohowalla, J. N., Rangam, C. M., Gupta, J. C., Bhagwat, A. G. & Adawal, S. K. **Superficial Infections in the Newborn.** *Indian J. Child Health.* 1960, May, v. 9, No. 5, 231–7. [12 refs.]

A study was made of superficial infections in infants delivered in a general hospital in Indore. Many of the cases were admitted to hospital for some complication, visitors to the ward were numerous and the babies were nursed with the mothers, rather than in a communal nursery.

There were 1,298 infants born alive in the 8-m period, of whom 236 (18·2%) had superficial infec 51·7% of these infections were conjunctivitis, 24 stomatitis and 20·3% skin infections. 61 of these infections were examined bacteriologically and yie 66 strains, 25 of which were *Staphylococcus aureus* being from the 25 skin lesions examined. 10 of 20 str from the mouth were *Candida* and 5 of these were *tropicalis.* The remaining strains isolated were *st albus* (10) *Escherichia coli* (11) *Pseudomonas pyocy* (5) *Proteus* (2) *streptococci* (3). Blood cultures f these 61 patients were negative.

There were 13 deaths among the 236 infected infa all but 2 of these infants were premature. Sensiti tests suggested that of 4 antibiotics tested, oxytetracyc appeared to be the drug of choice.

M. Patricia Jevo

Datta, Naomi & Pridie, R. B., with a note by E Anderson. **An Outbreak of Infection w** *Salmonella typhimurium* **in a General Hospi** *J. Hygiene.* 1960, June, v. 58, No. 2, 229–41, 3 [11 refs.]

This paper does not describe an institutional outbr of salmonella food-poisoning but an unusual epide caused by *Salmonella typhi-murium,* phage-type 27, large general hospital, which continued for some weeks and involved at least 250 persons, compri infant and adult patients and all sections of the hosp staff except those employed in the kitchens. This in ded laundry and domestic but not maintenance s The precise origin of the epidemic was not discov and the first knowledge of the infection came from arate cases in different wards. The infection gradu became established and spread to practically every of the hospital. At the height of the epidemic hosp patients were becoming infected at the rate of abou per week; the peak among the hospital staff, as woul expected, came a little before that of the patients was of the same order. The bacteriological and demiological investigations carried out by Mrs. D were very comprehensive, but at no time throughout epidemic was there any evidence of a food-borne spr There was, however, much evidence to show that pital cross-infection (directly from person to perso indirectly through the contaminated environment) responsible for the continuance of the epidemic w was only brought under control by drastic administra measures.

[The importance of cross-infection in institutional breaks among infants is, of course, well recogn whether the organism responsible is one of the ent pathogenic *coli* or one of the salmonella group. M over, Linetskaya-Novgorodskya, an experie worker from Leningrad, in a recent contribution WHO Bulletin on diarrhoeal diseases [this *Bulletin,* v. 35, 669] draws attention to the fact that infants contract salmonella infections in the first weeks of continue to excrete the organisms for very much lo periods than older persons. It is these infants, who so frequently returned to their homes still excr

monellae, she suggests, who are largely responsible the greatly increasing numbers of sporadic or small nily outbreaks now being reported. She considers t epidemiologists should pay more attention, in inves- ating outbreaks, to the possibility of an infant human rrier infecting the home in much the same way as ler children carry Sonne dysentery into the family usehold.]

There have been several institutional outbreaks of ection with *Salm. typhi-murium* where the epidemio- gical picture has not been typical of a food-borne ection and cross-infection method of spread has been spected but the evidence has been incomplete. though a phage-typing scheme for *Salm. typhi-murium* s been available for some time, it is only very recently at a number of phage types, previously grouped as typable, have become identifiable. Phage-type 27 is ong this number [*ibid.*, 1960, v. 35, 300]. It was the ailability of the typing-phage for strain 27 that made possible to show that this phage type was solely sponsible for the epidemic. Other types of *Salm. typhi- rium*, isolated during the course of the investigations re apparently of low infectivity; there was no evi- nce of spread of infection from the persons excreting ese types.

The experimental studies of McCULLOUGH and EISELE his *Bulletin*, 1951, v. 26, 1118; 1952, v. 27, 785] on the man infective doses of various salmonella organisms monstrated the very wide differences observed in the fectivity of different strains of the same sero-type. *lm. typhi-murium* was not one of the salmonella organ- ns included in their experiments and although these orkers determined infective doses for the development clinical illness they did not determine actual minimal fective doses. Nevertheless it has generally been sumed that the ingestion of anything less than a million lmonella organisms is not a hazard to health. The evi- nce presented by Mrs. Datta and her colleague rongly suggests that the infective dose of phage-type 27 as nothing like of this order. The isolation of type 27 om bed-sheets was accomplished only with some diffi- lty by culture of the whole sheet yet the mere hand- ng of such sheets was responsible for several cases of fection. This is only one piece of evidence; there are any other pieces, all of which are, it is admitted, ithout quantitative support, but they all indicate that e infective dose of phage-type 27 must have been very nall.

E. S. ANDERSON, Director of the Central Enteric Ref- rence Laboratory and Bureau who undertook the nage-typing of the strains isolated, has added an inter- sting note about phage-type 27 at the end of this paper. n addition to the present outbreak, type 27 has been sponsible for a number of smaller hospital outbreaks ith a similar epidemiological pattern. There have been w sporadic incidents and, as far as is known, no food- orne outbreaks due to this strain. There is at present o information about its origin.

This paper is therefore of considerable importance nd the account of the epidemic makes very interesting eading. This is the first published description known o the reviewer of a *Salm. typhi-murium* epidemic of onsiderable size where the method of spread has been conclusively shown to be due solely to cross-infection. The authors draw attention to another that occurred a few years ago where the epidemiological pattern was similar, but do not mention whether phage typing facilities were available. The account was not published.

The investigations recorded by Dr. Datta and Dr. Pridie pose many questions that can only be answered by further bacteriological and epidemiological studies of salmonella infections in general and in particular those associated with *Salm. typhi-murium*, phage-type 27.

[See also this *Bulletin*, 1959, v. 34, 149.]

H. J. Bensted

HART, D. **Bactericidal Ultraviolet Radiation in the Operating Room. Twenty-Nine-Year Study for Control of Infections.** *J. Amer. Med. Ass.* 1960, Mar. 5, v. 172, No. 10, 1019–28, 2 figs. [Numerous refs.]

This paper recapitulates the evidence that Hart has published in the past [*e.g. J. Amer Med. Ass.*, 1941, v. 117, 1610] and the value of direct irradiation with ultraviolet in reducing the incidence of staphylococcal wound infection. The analysis has not been extended beyond January 1941, although it is stated that the results have continued to be satisfactory and "unexplained infections in clean operative wounds not only have been explained but have been eliminated, to a great extent". The numerous references are practically all to Hart's own papers. *R. E. O. Williams*

COCCAL INFECTIONS

The order in this section is:—*Staphylococcus, Streptococcus, Neisseria, Others.*

RODDYN, L. **Epidemiology of Staphylococcal Infections.** *J. Hygiene.* 1960, Mar., v. 58, No. 1, 1–10, 4 figs

17 families observed among the patients in a general practice in North London experienced more than 1 staphylococcal infection during an 8-year period; in 11 families the several infections were all due to one phage type of staphylococcus. In 1 family there were 11 different septic lesions in 5 individuals; another had 8 lesions in 3 people. Even though many of the people were persistent nasal carriers, spread of infection seemed to occur mostly at times when one person had a septic lesion. In 6 of the 11 families the staphylococci belonged to phage group II and in 4 to group I; the latter seemed to have become relatively more frequent in the later years. The interval between successive cases in a family was commonly several months. [See also this *Bulletin*, 1955, v. 30, 360, for an earlier study by the author.] *R. E. O. Williams*

ROODYN, L. **Recurrent Staphylococcal Infections and the Duration of the Carrier State.** *J. Hygiene.* 1960, Mar., v. 58, No. 1, 11–19. [12 refs.]

Of 81 patients who first presented in a general practice with a boil or stye in 1951–2, 72 either had no recurrence, or only an early local recurrence. In all of the 9 patients who had recurrent attacks of boils, the successive lesions were due to the same phage type of staphylococcus, even when the interval between the infections was several years.

Chronic skin carriage seemed to occur in some patients and staphylococci could sometimes be found in the depths of the skin (sampled through a superficial incision) in the absence of nasal carriage.

Of 23 patients who suffered 1 or more recurrences 16 had a staphylococcus in the nose of the same type as that in the lesions, 2 had different strains, and 5 were not nasal carriers. 5 patients were shown to harbour the same type of staphylococcus in the nose when swabbed at intervals over, respectively, 7, 6, 5, 5 and 4 years.

R. E. O. Williams

JOHNSON, A., ROUNTREE, Phyllis M., SMITH, Katherine, STANLEY, N. F. & ANDERSON, K. **A Survey of Staphylococcal Infections of the Skin and Subcutaneous Tissues in General Practice in Australia, May–December, 1958.** *Nat. Health & Med. Res. Council Spec. Rep. Ser. No. 10.* 52 pp., 2 maps & 4 figs. [20 refs.] 1960. Canberra: Govt. Printer.

From May to December 1958 the doctors in 44 general practices in different parts of Australia took swabs from septic lesions in their patients, and from the patients' noses, and completed a questionary form. All patients were seen at home or in the doctor's consulting room. Swabs were examined for *Staphylococcus aureus* and all strains isolated were tested for antibiotic resistance and phage type.

2,164 patients were included in the survey. About 20% were under 9 years and 50% under 30 years of age; these proportions conformed closely with the proportions at corresponding ages in the total population. Lesions were disproportionately common in the 30–39 age-group and rather less common than would be expected from the populations at ages of 40 and over. The ratio of males to females was about 3:2 at almost all ages.

32% of the cases were furuncles, 82% of all lesions yielded *Staph. aureus* on culture. 31% of lesions were on the upper limb. [Detailed tables are given of the distribution of some of the commoner types of lesions in different regions of the body, in males and females, and at different ages.]

Of 1,618 staphylococci examined 64% were resistant to 0·5 unit of penicillin. Only 2·3% were resistant to tetracycline, 1·4% to streptomycin, 0·8 to erythromycin and 0·5 to chloramphenicol. The proportion of penicillin-resistant strains was highest in the patients under 1 year of age and the lowest in those 5–9 years old. There was little variation from the mean value in those 15. Apart from the effect of age, the percenta resistant strains did not vary much in the different of lesions.

The most striking feature of the survey was th that 46·6% of the staphylococci fell into 1 or ot the related types 80/81, 52/52A/80/81, etc. (refer throughout as 80/81). 8·1% were other Group I 14·9% Group II and 14·4% Group III; 9·4% we typable. A similar distribution was found in all pa Australia. 80/81 was equally common in carbu furuncles, and varicus abscesses, but was less co in paronychia, impetigo and infected abrasions.

90·6% of the 80/81 strains were penicillin-res but only 4·2% were resistant to other antibiotics as For the other strains the percentage penicillin-re were: group I, 31; group II, 20; and group III, 69

Nasal swabs taken from 2,138 patients at thei attendance gave a carrier rate for *Staph. aure* 34·9%; 5 areas in the northern part of the country a consistently low rate, averaging 24% compared an average of 44% for the southern areas.

35% of the patients had type 80/81 in their Altogether 23·5% had a staphylococcus of the same in nose and lesion, 12·6% staphylococci of dif types in the 2 sites, and 63·9% were not nasal ca 57·6% of the patients' nasal strains were peni resistant. The association of nose and lesion sta coccus was slightly higher in patients with chron recurrent lesions.

There was no close association of phage type 71 impetigo.

Incidentally, records were obtained of 13 instanc multiple cases within 1 family; in 11 cases type was responsible. Inquiries were made in some are discover whether patients with type 80/81 infection had any recent contact with hospitals; in Canber seemed that up to half the cases had such contac elsewhere there was very little evidence of it.

[This is a very valuable and interesting report, sented in considerable detail. It may be noted although staphylococci of type 80/81 have been spread as a cause of epidemics in hospitals in B they do not, yet, appear to have spread into the ge population to anything like the extent reported Australia.]

R. E. O. Willia

PAGANO, J. S., FARRER, S. M., PLOTKIN, S. A., BRACH P. S., FEKETY, F. R. & PIDCOE, V. **Isolation Animals of Human Strains of Stahpylo during an Epidemic in a Veterinary Sc** *Science.* 1960, Mar. 25, v. 131, 927–8.

During 3 successive years, students of the senior in a veterinary school in Pennsylvania experienc very high incidence of septic lesions due to stap cocci of phage type 80/81. The high incidence was fined to the senior students, and in one survey no than 46% of them were found to be nasal carrie the epidemic staphylococcus. Of 137 coagulase-po staphylococci isolated from animals in the school's h tal, 22 were type 80/81. It is suggested that, alth

e infection was probably transmitted largely from per-n to person among the students, some animals may ve become infected and acted as sources for further read. *R. E. O. Williams*

ŞILĂ, V. T., VASILESCO, I., DRAGOMIRESCO, M., PINTEA, L. & ALEXANDRESCO, R. La capacité d'extinction des sérums des malades de scarlatine traités par l'érythromycine. [**Extinction Capacity of the Sera of Patients suffering from Scarlet Fever, treated with Erythomycin**] *Arch. Roumaines Path. Expér. et Microbiol.* 1959, Sept., v. 18, No. 3, 385–9, 1 fig. [24 refs.]

Schultz-Charlton reactions were carried out with serum ken from 35 children with scarlet fever who were eated with 0·4–1·2 gm. erythromycin per day for 6 ys. No serum taken at the 7th day produced any action of extinction; 54·5% were positive by the 21st y and all were positive by the 35th. The rise in anti-dy was slower than in patients treated symptomatically 1950–51. *R. E. O. Williams*

MONDS, B. E. R. **Epidemic Nephritis in South Trinidad.** *J. Pediatrics.* St. Louis. 1960, Mar., v. 56, No. 3, 420–24, 7 figs.

This is an interesting paper although the laboratory ta are unfortunately scanty. An epidemic of acute phritis, largely in male children, occurred in Trinidad tween November 1958 and March 1959; 263 children der 10 years of age were admitted with this disease to e hospital, a large number to the other large hospital the island, and there was a small increase of adult missions with acute nephritis. Not only was the inci-nce greatly increased but there was a history of a eceding cough or cold in 36·9% of the patients admit-l, as compared with 7·4% of similar cases before the tbreak. The presenting symptom almost invariably as the oedema, and systolic and diastolic hypertension as usually present. The most dramatic development ring the course of the disease was desquamation of e palms and soles and sometimes also of the trunk and nbs in 75 cases (28·5%); 20 of these children and 10 hers were said to have had a generalized rash 2–3 eeks before admission. Blood urea was only slightly creased, and there were no facilities for estimation of tistreptolysin titres or streptococcal typing.

In most cases recovery was rapid (2–3 weeks) and no quelae were observed except nephrosis in 1 case; 7 ildren had fits, and 22 developed cardiac failure, 5 of ese being fatal within 48 hours of admission. The st mortem findings included acute glomerulonephritis d anasarca with pulmonary oedema.

This outbreak was almost certainly associated with an recognized outbreak of scarlet fever among coloured ildren. The streptococcus involved was probably of phritogenic type, as there was no coincident increase acute rheumatism. *H. Stanley Banks*

FEINSTEIN, A. R. & SPAGNUOLO, M. **Mimetic Features of Rheumatic-Fever Recurrences.** *New England J. of Med.* 1960, Mar. 17, v. 262, No. 11, 533–40. [24 refs.]

This is an important paper the findings of which, if confirmed, may have a practical bearing on the prophylaxis of rheumatic fever. 161 patients undergoing prophylactic treatment, and who had had 370 attacks, were classified on the basis of modified JONES diagnostic criteria (*J. Amer. Med. Ass.*, 1944, v. 126, 481)—that is, for valvular involvement a diastolic murmur at the base or the left sternal border, or a long systolic murmur at the apex radiated to the axilla. On this basis 61 had had no valvular involvement in the first attack, and none of them developed heart disease in their subsequent attacks; 90 had had valvular involvement in their first attack, and in their subsequent attacks there was either no change or new valvular involvement, sometimes with cardiac enlargement, pericarditis, or congestive cardiac failure; in 10 patients considered free from heart disease in the first attack a diastolic murmur was discovered at a subsequent attack, but in 8 of these the pattern was such that the murmur might have escaped notice in the first attack. The non-cardiac features of acute rheumatism (polyarthritis etc.) were frequently repeated in subsequent attacks in all 3 groups of the patients.

These results suggest that the rheumatic fever patient has a specific and persistent liability either to get or to avoid heart disease. When this does not occur in the first attack it will also be absent (with dubious exceptions) in a subsequent attack. In most patients who develop heart disease it is manifest in the first attack. This is the group of rheumatic fever patients which is liable to further cardiac damage in subsequent attacks, and it is this group particularly which should be selected for continuous and very prolonged anti-streptococcal prophylaxis. *H. Stanley Banks*

WIELAND, R., KATZ, J. & HELLERSTEIN, H. K. **Prophylaxis against Streptococcic Infection in an Adult Rheumatic Population.** *J. Amer. Med. Ass.* 1960, May 28, v. 173, No. 4, 350–53. [14 refs.]

The authors feel that penicillin should be used prophylactically in adult rheumatic subjects at least till age 40 [this *Bulletin*, 1959, v. 34, 1007]. In this study only 27·7% of 101 adult patients studied at the Cleveland Area Heart Society took penicillin regularly although free supplies of the drug were available. Figures were higher among patients treated at a medical teaching centre and further education both lay and medical is required if the benefits of prophylaxis are to be made available to rheumatic adults. *A. B. Christie*

RISCHBIETH, R. H. **Pneumococcal Meningitis—a Killing Disease.** *Med. J. Australia.* 1960, Apr. 9, v. 1, No. 15, 578–81, 2 figs. [14 refs.]

This article, based on 28 adult cases with a 50% fatality rate, is rambling and gloomy, except perhaps for

the prophylactic success attending repair of dural defects after head injuries. Above the age of 50 the fatality rate rose to 80%, but in the same community in 169 children with meningitis of all forms the mortality in 26 with pneumococcal infection was only 26% [serious enough]. The group of patients who were unconscious or delirious on admission had the highest mortality rate. Grossly raised intracranial pressure may be associated with tentorial herniation, and here ventricular tapping may be a life-saving measure.

The routine treatment recommended is penicillin in very large doses every 2 hours intramuscularly plus penicillin 10,000 to 15,000 units intrathecally, and sulphonamides intravenously and orally. An anti-convulsant should be given prophylactically to guard against convulsions.

A useful prophylactic measure in compound fractures of the skull is adequate surgery with repair of dural defects; the radical treatment of chronic ear disease would also sometimes prevent meningitis.

H. Stanley Banks

Chassagne, P. & Gaignoux, Y. Caractères épidémiologiques de la méningite cérébro-spinale à méningocoques en France, en 1955, 1956, 1957 et 1958. [**Epidemiological features of Meningococcal Cerebrospinal Meningitis in France, 1955 to 1958**] *Bull. Inst. Nat. Hyg.* Paris. 1959, Sept.–Oct., v. 14, No. 5, 1039–53.

In the 4 years 1955 to 1958, 3,326 cases of cerebrospinal meningitis were notified in France, with 451 deaths. The annual figures were appreciably above average in 1956 and 1957. This investigation was limited to 1,399 cases, the reason being the defective details rendered by some local medical authorities: none at all came from 42 departments. It is clear that the term cerebrospinal meningitis is used loosely by doctors. 203 of the 1,399 cases studied manifestly were not meningococcal, and they were eliminated. The disease appears to be associated with urban life, overcrowding, poor housing and undernutrition. 58% of cases were in males; this proportion was almost constant through the individual years and persisted at all age-groups below 50 years. Young children were the most frequent sufferers, the maximum incidence occurring between 4 and 10 months of age. A secondary peak of incidence around 20 years was accounted for by military service, but adults over 20 years old accounted for only one-sixth of cases. When towns of over and under 10.000 inhabitants were compared, the incidence in small children was markedly higher in the big towns, whereas that of adults was much the same.

Out of 494 cases whose circumstances in regard to infection could be studied in detail, 267 were children under 4 years, of whom 223 had lived entirely in their family circle. Of children between 5 and 14 years only 1 attended a boarding school. Of 133 adults 35 were in the armed services: the others pursued diverse occupations, mainly industrial workers, manual and agricultural labourers, tramps and miners. Only 3 times did 2 cases occur in the same family, and there were no instances of epidemics in crêches, schools, holiday camps and the It was practically never possible to establish any s contact between two cases. On the other hand disease is undoubtedly associated with certain geogr cal areas, usually densely populated working-class Carrier investigation has seldom been attempted. I investigation, out of 293 cases a contact carrier found in only 91, the contacts of the remaining 20 being negative. In this connexion, however, the culty of culturing the meningococcus must be bor mind. Out of 919 cases in which the end result known, 10% died; of those who recovered only 6 known to have sequelae. The death rate was highe children under 6 months, 18%. *B. B. Wad*

BACTERIAL INFECTIONS

The order in this section is:—*General, Co bacterium, Haemophilus, Enteric bacteria, Bru Pasteurella, Anaerobes, Spirochaetes, Others.*

Kaufman, S. & Bruyn, H. B. **Pertussis. A Cli Study.** *J. Dis. Children.* Chicago. 1960, v. 99, No. 4, 417–22, 4 figs. [18 refs.]

Whooping cough is reviewed on the basis of exper of 199 cases admitted to San Francisco General Hos in the 10½-year period 1947–58; 38% of the cases under 6 months of age when admitted.

Pertussis remains second to bronchopneumonia i list of significant infectious diseases of infancy. C to child contact within the home is the most impo source of infection. Of the various methods avai for protection of the neonate, probably the safest best is adequate primary or booster immunizatio siblings during the maternal gestation period. would be likely to reduce the amount of whoo cough in babies—which is the main problem.

Antibiotic therapy is effective during the catar stage, but diagnosis at this stage is difficult. The during the paroxysmal stage is not thought to alte clinical course in most cases, and may not pre secondary bacterial complications. Nevertheless in critically ill, and in the infant, it is good practice to antibiotics, and also hyperimmune human globuli the hope that the paroxysmal stage will be shortene

H. Stanley Ban

Vysoká-Burianová, B., Burian, V., Flasarová, Gostoff, R., Janícek, B., Mazel, J., Skalickov & Zimola, J., with the technical assistance o Padour. Dynamika transplacentárně přenese protilátek proti pertusi a parapertusi. [**Dyna of Transplacentary Transmission of Antibo against Pertussis and Parapertussis**] *Česko Epidemiol., Mikrobiol., Imunol.* Prague. 1 v. 9, No. 4, 223–8, 2 graphs.

The English summary appended to the paper i follows:—

"The authors followed the dynamics of transplacen-ily transmitted antibodies against B. pertussis and B. rapertussis in the same child by examinations of cord ood samples, of blood samples of the new-born child the 4th, 8th, and 12th week of life. A total of 71 new-rn children were investigated.

"The results show that the transplacentarily trans-itted antibodies do not persist longer than four weeks $\frac{1}{4}$–$\frac{1}{3}$ of children. In the 8th week of life antibodies ainst pertussis could be found in only 4·7 p. c. and tibodies against parapertussis also in only 4·7 p. c. of ildren. It follows that, in the second month of life, –96 p. c. of new-born children do not possess any anti-odies against pertussis or parapertussis.

"The authors discuss the question of the vaccination heme and recommend to complete the scheme by an jection of plain unprecipitated vaccine against pertussis ready in 2½ months of life. In 3½ months, the vaccina-on should proceed in a like manner as performed till ow."

LACHCINSKA, Janina. Ocena skuteczności szczepień ochronnych przeciw durowi brzusznemu. III. Testy laboratoryjne z krwią lub surowicą ludzi szczepionych różnymi rodzajami szczepionek. [**An Evaluation of the Efficacy of Vaccination against Typhoid Fever. III. Laboratory Tests on Blood or Serum of Persons Immunized with Different Anti-Typhoid Vaccines**] *Przegląd Epidemiol.* Warsaw. 1960, v. 14, No. 1, 1–14, 2 figs. [38 refs.] English summary.

An investigation of the immunizing power of 3 types typhoid vaccine has been carried out in 2 groups of persons given endotoxic or bacterial vaccine respec-vely and in 20 persons given a pentavalent vaccine ntaining tetanus toxoid. Samples of blood were taken the beginning of vaccination and again after 4–6 eeks and 6 months, and were examined for the presence antibody by passive immunization tests in chick nbryos, agglutination and opsonophagocytic tests. An mmune response was detected by all 3 methods, and e results are presented in tables and figures. The sults obtained by the different methods were not con-stent, however, presumably on account of the fact that fferent types of antibody were being detected. The thor concludes that a satisfactory vaccine cannot be lected on the basis of laboratory tests alone in the sence of epidemiological observations among a ccinated population. [For the previous part, see this *ulletin*, 1957, v. 32, 489.] *D. J. Bauer*

LOAN, R. S., WILSON, H. D. & WRIGHT, Helen A. **The Detection of a Carrier of Multiple Phage-Types of *Salmonella paratyphi* B.** *J. Hygiene.* 1960, June, v. 58, No. 2, 193–200, 1 fig. [10 refs.]

Over a period of some 4 years, 3 cases of paratyphoid fever occurred in an area in Scotland where the infec-ons were traced to a polluted stream from which *lmonella paratyphi B* had been isolated on several ccasions. The first case was in 1954 and had been shown to be due to phage type Taunton; samples taken from the stream water at that time had also yielded *Salm. paratyphi B* of the same phage type. The 2 subsequent cases in 1958 were caused by phage types Dundee and Taunton, respectively, and a summary of the results of many examinations of the water showed that the organisms isolated belonged to 4 different phage types: in addition to types Dundee and Taunton there were phage types 3a1 var. 1 and 3a1 var. 4. The search for carriers responsible for the pollution of the stream resulted in some complicated but most interesting findings. It was eventually shown that the pollution of the stream was due to an old lady who was excreting at least 3 of the 4 phage types isolated from the water of the stream: Taunton, Dundee and 3a1 var. 4. This old lady of 81 years who had suffered from paratyphoid fever some 20 years previously, had lived for the past 10 years in a condemned cottage, in which there was no WC but only a privy pail. For the whole of that period she had been regularly polluting the stream by emptying her privy pail directly into it. The earlier examinations of her faeces had yielded cultures of paratyphoid B in which only phage type 3a1 var. 4 had been identified, but, when other possible sources for the additional phage types had been eliminated, it was decided to phage-type a number of single colony cultures from the primary platings of both her faeces and urine. It was found, in 23 single colony cultures, that the 3 phage types mentioned above were about equally represented. There seemed to be little doubt therefore that the complicated bacteriological findings were directly related to a single carrier, for once administrative measures had made it impossible for the old lady to continue polluting the stream water, paratyphoid bacilli could no longer be isolated from it so that she was in all probability also excreting the unexplained fourth phage type, 3a1 var. 1.

[This is an important and well written article. It is of such interest that one is apt to overlook the enormous amount of work involved in solving the intriguing problem.] *H. J. Bensted*

BERNSTEIN, A. **Laboratory Investigations of a Carrier of Multiple Phage Types of *Salmonella paratyphi* B.** *J. Hygiene.* 1960, June, v. 58, No. 2, 201–6.

This is an account of the laboratory investigations undertaken in the attempt to explain the excretion, by the paratyphoid carrier described in the previous abstract, of three phage types of the organism. The two articles should be read in conjunction with each other.

Although the possibility of multiple infection with different phage types cannot be excluded, the occurrence in the intestine or gall bladder of the carrier of phage-mediated conversion can offer an explanation for the multiple phage types from a single infection. Phage type 3a1 var. 4 is known to be unstable on storage and a variable proportion of strains of this type will, after an interval of time, give rise to cultures of type 3a1 var. 1. Phage type 3a1 var. 4 isolated from the carrier in question was not sensitive to any of the temperate phages isolated from the strains, but cultures of 3a1 var. 1 were sensitive to phages isolated from the Taunton

and Dundee strains and were capable of being converted by these phages into types Taunton and Dundee respectively. It is possible therefore that the carrier was originally infected with *Salmonella paratyphi B*, phage type 3a1 var. 4. During the long carriage by her of this strain some of the organisms could have been converted to type 3a1 var. 1, which came into contact with, and were lysogenized by, phages which converted them to types Dundee and Taunton. Although this explanation would seem reasonable laboratory experiments cannot decide what actually took place in this carrier. The author draws attention to the rarity in practice of phage-mediated conversion of phage types and of the attendant difficulties [this *Bulletin*, 1957, v. 32, 185; *ibid.*, 1959, v. 34, 72]: over 14,000 cultures of *Salm. paratyphi B* have been phage-typed in the Central Enteric Reference Laboratory and there have only been six such incidents encountered. *H. J. Bensted*

MAIR, N. S. & ROSS, A. I. **Survival of** *Salm. typhi-murium* **in the Soil.** *Monthly Bull. Ministry of Health & Pub. Health Lab. Service (directed by Med. Res. Council).* 1960, Mar., v. 19, 39–41.

This paper describes a small family outbreak of enteritis in 3 young children who were found to be excreting *Salmonella typh.-murium*, phage Type 1a. The ages of the children were 3 years, 2 years and 2 months respectively.

No foodstuff was incriminated but the soil of the garden where the children played was found to contain *Salm. typhi-murium* of the same phage type. Further investigations revealed that about a week before the children became ill the father had dug cow manure into the garden. The manure had been kept in a drum for nearly 2 years before it had been used. When the empty drum was examined there was no evidence of viable salmonella organisms, but samples of the garden soil taken from the four corners and the centre yielded *Salm. typhi-murium*, phage Type 1a, in each case.

Although the evidence is not complete it is highly suggestive that the source of the infection was the manure. Had only that part of the garden where the children played been found to be contaminated with salmonellae, it could with good reason be assumed that the children themselves had been responsible because it was known that at some time during the period of their acute diarrhoea the older children had defaecated in the garden. There was no evidence to show that they used the four corners and the centre for this purpose and it is most unlikely that they would do so. The authors had the garden sealed off and continued to examine the soil at regular periods and found that *Salm. typhi-murium* was still present in the soil 251 days after the beginning of the survey. Later samples were negative but it would seem that the total survival time in the garden soil was not less than 280 days. It might well be very much more.

[There are two important links missing in this interesting story: there is no proof that the children contracted their salmonella infections from the contaminated garden soil and there is no proof that the cow manure contained salmonella organisms and that the garden soil was contaminated by this material. Nevertheless the evidence is very suggestive. The paper itself is more concerned the viability of *Salm. typhi-murium* in the garden but the infection of the children appears to be closely related to the digging in of the cow manure it was about this time that the children became infe Young children are very susceptible to infection salmonellae and there is growing evidence to inc that a significant proportion of these infections are tracted from contaminated environments where degree of contamination must often be light. This is important, for apart from the valuable confirm evidence of the long viability of *Salm. typhi-mur* soil under favourable conditions, it draws attentio cross-infection as a method of spread of infecti small, non-institutional salmonella outbreaks. there can be no doubt about the person-to-perso contaminated-environment method of spread of sa nella infections in young children, it is considered cross-infection with this group of organisms des more serious study than has been given in the whether the subjects are children or adults.]

H. J. Bens

ADAMS, A. R. D. **Bacillary Dysentery.** *Brit. Me* 1960, May 28, 1639–41.

This is an excellent review of the drug treatme bacillary dysentery both in this country and in tropics, and both in adults and in infants and chil The history is given of the discovery of the value o poorly absorbed sulphonamides in the Middle East ing the second world war, and then of the freely ab able sulphonamides (with the coincident risk crystalluria in the tropics) and later of the wide dev ment of sulphonamide-resistant strains of *Shigella fle* and *Sh. sonnei*. The value of streptomycin given o and of streptomycin-sulphonamide combinations su Streptotriad tablets, is set out, as well as the outsta performance of chloramphenicol and the tetracyc (although cost, availability, and the risk of side effec significant factors here). A combination of streptor (20 mgm./kgm.) and chloramphenicol (40 mgm./ daily is said to be highly effective in severe form gastro-enteritis of African children; but it is sur mistake to recommend a streptomycin-sulphona combination for "gastro-enteritis of infants" [pre ably of temperate climates] since this is only excep ally a manifestation of dysentery.

The section on supportive treatment, including fluid requirements of infants, is particularly well the recommendations are concise, clear, and exact the point. *H. Stanley Ba*

ROBERTSON, Isobel, HANSEN, J. D. L. & MOODIE, Ai **The Problem of Gastro-Enteritis and Maln tion in the Non-European Pre-School Chil South Africa.** *South African Med. J.* 1960, 23, v. 34, No. 17, 338–44, 8 figs. [29 refs.]

Gastro-enteritis is the paramount cause of deat non-European children of the pre-school age in S Africa, causing, in the coloured and Bantu populati

ne urban districts only, some 10,000 deaths per annum. n the country districts from which statistics are unobtainble at least as great a wastage of child life must occur. he proportions of deaths attributable to acute intestinal nfections in the first year of life among the townwelling coloured and Bantu communities are estimated s 38·8% and 34·8% respectively, and in the next 3 years s 46·3% and 34·7%. In Cape Town itself, gastronteritis comes second only to heart disease in the list f causes of death throughout the population as a whole. he most dangerous period for the growing child is from months to 2 years, after which the risk of death from is cause abruptly declines. Though in Cape Town the nfant mortality in non-Europeans had dropped from 170 er 1,000 live births in 1927 to 95 per 1,000 in 1957 the ncidence of gastro-enteritis among the causes of morlity has shown no proportionate reduction and it is ear that the problem of infantile gastro-enteritis still waits a solution.

Salmonella and *Shigella* infections play the aetiological ole in 37·5% of cases of acute alimentary infections in ne age-group under review, the role of pathogenic rains of *Escherichia coli* is uncertain, while the importnce of enteropathic viral infections is quite unknown. poradic examples of the disease may be attributed to ardiasis and to amoebic infections.

The prior state of nutrition of the infected child in the reat majority of cases determines the outcome and this vividly illustrated in a graph which shows that in fatal stances of the disease the weight of the child within month of death but before the onset of symptoms was ubstantially below the average non-European standard nearly all cases. There is often a complex interplay etween the dual aetiological factors of infection and alnutrition, the former promoting the latter, which on s part diminishes resistance to the infection. A recent quiry into the weight of non-European children attendg the Red Cross War Memorial Children's Hospital in ape Town showed that half were below the expected eight for their age and of them 16% were suffering om gross protein depletion. Premature weaning, due failure of lactation [probably attributable to maternal ubnutrition] or to the necessity of the mother's return work, is an important factor, since it deprives the nild of a food which is both sterile and of adequate rotein content.

Artificial feeding is often incorrect, for dried milk or ondensed milk is over diluted and is often given irregurly and intermittently. When money is short, sugar nd water, custard powder, cornflour, biscuits or other ereals are suspended in water and are given in lieu of ilk feeds. From 9 months of age the toddler is xpected to do without milk, and is fed on cereals or egetables, meat being considered too "strong". Fish ppears to be the salvation of many, who receive just nough animal protein from this source. By the age of those who survive begin to do better as they are now ble to fend for themselves and eat from the adult pot.

Among the environmental and social factors determing the high infant mortality rate from acute gastronteritis poor housing is the most important. Of 2 on-white residential districts of Cape Town, Athlone, here housing conditions are fairly satisfactory, shows a death rate only half as big as that in Windermere, where housing conditions and sanitation are very poor. Ignorance of the proper care of infants among urban mothers is widespread and is worse among fostermothers and young girls who are often left in charge of young children while their mothers work. Disordered family life due to irregular employment of either or both parents, illegitimacy, desertion by the father, alcoholism and mere negligence, gravely prejudice the infant's chances of survival. Finally it is admitted that poverty is widespread among the non-European elements of the population of the Union. In a recent survey it was found that among 300 coloured families who had contributed fatal cases of infantile gastro-enteritis, 80% had a total income of less than £20 a month and in 30% the figure was less than £10.

The authors describe methods of alleviating this deplorable state of affairs and outline the measures which are already in operation.

[The ultimate solution of the problem presented by the "staggering proportions" of the death rate from gastro-enteritis in the pre-school non-European child in the Union of South Africa can clearly depend only on a radical improvement in the economic status of this section of the population.] *J. H. Walters*

HARRIS, D. & CONE, T. E., Jr. *Escherichia freundii* **Meningitis. Report of Two Cases.** *J. Pediatrics.* St. Louis. 1960, June, v. 56, No. 6, 774–7. [10 refs.]

SCHIRGER, A., NICHOLS, D. R., MARTIN, W. J., WELLMAN, W. E. & WEED, L. A. **Brucellosis: Experiences with 224 Patients.** *Ann. Intern. Med.* 1960, Apr., v. 52, No. 4, 827–37. [24 refs.]

The authors report on a study of 224 patients with brucellosis examined at the Mayo Clinic during the 19 years 1940 to 1958. The cases are classified into (i) bacteriaemic, (ii) serological and (iii) localized, according to whether the organism was cultured, the diagnosis was supported only by agglutinins to a high titre and (iii) where localized lesions yielded the organism but it was not obtained by blood culture. Of the 224 patients, 47 were bacteriaemic and 42 yielded the organism by culture from a local tissue, of these 22 were *Brucella suis,* 8 *Br. abortus,* 5 *Br. melitensis* and in 7 the species was not determined, compared with *Br. abortus* (20), *Br. suis* (5) and *Br. melitensis* (4) and 18 undetermined obtained by blood culture.

The disease was largely occupational in farmers and butchers. Splenomegaly was the most frequent physical abnormality detected but even so was only recorded in 33 of the 224 patients. Fever was present in less than half the patients with localized brucellosis. In one patient renal granulomatous brucellosis was detected during an unrelated surgical procedure. Localized brucellosis of the lung, presenting as an asymptomatic nodule, is usually due to *Br. suis.* The leucocyte count was usually within normal limits; in 18 bacteriaemic patients and 24 others it was below 4,000 per cmm. but it was only above 10,000 per cmm. in 2 bacteriaemic and 16 other subjects. A sedimentation rate above 20 mm.

(Westergren) was rather infrequent, being found in only 10 of 47 bacteriaemic patients and in 61 others. Examples of spondylitis, suppurative lesions in bones and other joints and prepatellar bursitis are recorded. The authors did not find skin testing a reliable method of diagnosis. In treatment they relied chiefly on a combination of tetracycline and streptomycin for bacteriaemic patients, combined with surgical drainage or excision of localized infections.

[A well documented report. The frequency with which brucellosis may occur in the absence of splenomegaly and a raised sedimentation rate should be noted.]

Frederick J. Wright

PEERY, T. M. & BELTER, L. F. **Brucellosis and Heart Disease. II. Fatal Brucellosis: a Review of the Literature and Report of New Cases.** *Amer. J. Path.* 1960, June, v. 36, No. 6, 673–97, 10 figs. on 2 pls. [71 refs.]

The authors have made a diligent search for records of post-mortems of fatal human brucellosis. Reviewing only those reports which are adequate (44 confirmed by culture and 15 by serology only), it is evident that the usual cause of death (in this disease which is rarely fatal) is endocarditis. As the infection is a chronic one, there is a greater tendency to fibrosis, hyalinization and calcification than is usually found in endocarditis due to other organisms and death results more commonly from heart failure than embolism. The aortic valve is affected more frequently than other valves, particularly when the species is *Brucella abortus*. Lesions resembling Aschoff bodies, probably brucellar in origin, are commonly found in the myocardium. Fatal disease tends to be limited to adult males presumably due to more prolonged and repeated exposure to infection.

[See also this *Bulletin,* 1958, v. 33, 746, and 1959, v. 34, 129.]

[With adequate treatment by antibiotics this occasional fatal result should become even rarer. Probably in countries where prolonged inadequately treated brucellosis proceeds to a fatal issue adequate post-mortem records are scarce. The material analysed may therefore be selective and endocarditis may be the complication most difficult to cure rather than the most frequently fatal.]

Frederick J. Wright

BOURREL, P. & SOUVESTRE, R. Premiers cas africains de mélitococcie vertébrale. A propos de 3 cas dépistés au Soudan. [**Three Cases of Brucellosis of the Spine in Africans in Sudan, French West Africa**] *Bull. Soc. Path. Exot.* 1960, Jan.–Feb., v. 53, No. 1, 67–71.

Among 44 patients thought at first to be suffering from tuberculosis of the spine (Pott's disease) 2 were found to have negative tuberculin reactions and to show agglutination to *Brucella* in high dilutions of the serum. The radiographic appearances of the spine in these two were also suggestive of brucellosis whereas in the remainder with radiographic changes typical of tuberculosis the agglutination test for *Brucella* was negative or only feebly positive. In the first 2 cases brucellosis affe the lumbar spine, in a third case in which there was hepatosplenomegaly, the bony lesions were in cervical spine. Cure followed treatment with peni and streptomycin in the first case and in the other which oxytetracycline was used in addition.

[This report widens the field in which brucellosis o spine has been recorded, but for earlier report Africans see this *Bulletin,* 1954, v. 29, 812.]

Frederick J. Wri

SPINK, W. W. & BRADLEY, G. Mary. **Persistent P sitism in Experimental Brucellosis: Attempt eliminate Brucellae with Long-Term Tetracyc Therapy.** *J. Lab. & Clin. Med.* 1960, Apr., v No. 4, 535–47, 3 figs.

A persistent infection with the tetracycline-sens strain of *Brucella melitensis* 368 was readily establi in mice by introducing between 50,000 and 100 organisms intraperitoneally. Colony counts on spl of untreated infected controls showed that the organ multiplied up to 8 weeks after infection and that betv 12 and 16 weeks there was an abrupt decrease, but could still be cultured from about one-third of spleens 40 weeks after infection.

The effect of tetracycline was determined by sta treatment 4 weeks after infecting the mice, using 60 m per kgm. of tetracycline HC1 orally each day f month, 3 months, 6 months and in 1 experiment f periods of 1 month each with a 3 months' interval. the experiments were terminated 38 to 40 weeks a infection. When treatment was given for 1 mo although there was an enhancement of suppressio multiplication of brucellae, at the end of 40 weeks a one-third of the spleens were found to be infected, w was a similar proportion to that in the control gr When the mice were treated for 3 to 6 months bruc could not be recovered from the majority of the spl at the end of the experiment; a similar result obtained from the intermittent administration in the experiment. Prolonged treatment did not alter pattern of titres of *Brucella* agglutinins compared the controls.

The experiments emphasize that latent infections persist over a long period of time after intensive supp sive therapy. These infections in mice show a simila to the persistence of infection in apparently healthy g and cattle.

[The difficulty of assessing the position in hu infections where a prolonged state of ill health and persistence of agglutinins in the blood may follow acute illness is illustrated by these experiments.]

Frederick J. Wrig

TSAREVA, M. I. **Water-Borne Outbreaks of Tu aemia in Moscow Oblast.** *J. Microbiol., Epider & Immunobiol.* London. 1959, v. 30, No. 3, 3 [Translated from Russian.]

Until comparatively recent years there have been references in the literature to water-borne outbreak

laraemia although THJØTTA [this *Bulletin*, 1931, v. 6, 5] indicated that Norwegian 'lemming fever', a disease ought to be related to tularaemia, was due to the conmption of drinking water polluted with the excreta nd bodies of the lemming.

Since the war there have been several outbreaks of laraemia in the Moscow area which have been traced the drinking of well water polluted by domestic dents infected with tularaemia. The contamination of ch still waters has resulted in heavy infections among ose at risk. Moving stream water may be similarly ntaminated but usually the concentration of *Brucella larensis* in these waters is significantly lighter and sulting infections in man are less serious. Several of e outbreaks have been fully investigated; *Br. tularensis* as been isolated from the dead rodents in the water and so from the water itself. In the opinion of the author ass vaccination of the population at risk offers a very gh degree of protection and is probably the most satisctory method of dealing with the problem. The live laraemia vaccine is widely used in the U.S.S.R. In ite of the fact that the virulence of *Br. tularensis* olated in the U.S.S.R. is much lower than the strains olated in the U.S.A. [OLSUFIEV *et al.*, this *Bulletin*, 960, v. 35, 506] the infectivity of the strains seems to be a high order. *H. J. Bensted*

HMUTER, M. F. **Cases of Tularaemia in Sugar Factories.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1959, v. 30, No. 3, 57–64. [Translated from Russian.]

Loads of sugar beet were transported from a district ver-run with small rodents, and where the local popula-on had cases of tularaemia, and brought to a group of gar factories in an area where there was no tularaemia. Within a short interval cases of tularaemia began to ppear among the factory workers. *Brucella tularensis* as isolated from the water in which the beets were ashed and from the beets themselves. There seemed be no doubt that during the handling and processing the beets the environment became so contaminated ith *Br. tularensis* that not only were the actual handlers the beets infected but also the administrative staff of e factories who would not be expected to be at great sk. The condition of many of the beets showed that ey had been damaged, presumably by infected rodents, nd the epidemiological pattern of the outbreaks suggest at either the beet handlers themselves contaminated the nvironment with their infected hands or that the beet ashing and processing procedures spread the infection. Whatever the cause, such outbreaks constitute a serious onomic problem. During the first quarter of a year the tal incidence of tularaemia in 35 sugar factories (19 ere involved) was 1,081 persons. This meant a loss of 2,517 working days, small perhaps in comparison with hat tularaemia might mean in a similar outbreak among estern populations, but nevertheless of economic nportance. *H. J. Bensted*

BORODIN, V. P., SPITSYN, N. A., SAMSONOVA, A. P., KOROLEVA, A. P. & CHUNIKHIN, V. P. **Natural Tularaemia Foci of the Ravine-Steppe Type.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1959, v. 30, No. 3, 43–50, 1 fig. [Translated from Russian.]

Natural tularaemia occurs in a wide range of voles, various types of field mice, hares, hamsters and hedgehogs. The important ectoparasites on these animals are *Dermacentor marginatus* and *Rhipicephalus rossicus*. While it is possible that blood-sucking flying insects may play a role in spreading the infection there seems to be little doubt that the ticks are the important vectors; they become infected from their hosts and then act as reservoirs of infection. Human infections are usually contracted by the bite of a tick during the handling or trapping of field rodents. *H. J. Bensted*

STAHLIE, T. D. **The Role of Tetanus Necnatorum in Infant Mortality in Thailand.** *J. Trop. Pediatrics.* London. 1960, June, v. 6, No. 1, 15–18, 1 graph.

It is difficult to assess accurately the birth rate and infant mortality rate in a country like Thailand where notification is faulty and infants dying in the neonatal period are rarely seen by a doctor. Making allowance for these inaccuracies, tetanus appears to be the leading cause of death in the neonatal period. In a sample survey it was found that 37 of 2,344 children born alive had died in the neonatal period, 14 certainly, and 5 possibly, from tetanus. *A. B. Christie*

WRIGHT, R. **Treatment of Tetanus with Acetylpromazine.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1960, May, v. 54, No. 3, 270–73. [12 refs.]

Acetylpromazine appears to be about 10 times more potent than chlorpromazine in controlling the spasms of tetanus [this *Bulletin*, 1958, v. 33, 1130 *bis*]. The author, in Durban, treated 25 neonatal and 8 non-neonatal cases of severe tetanus. 3 of the 25 neonatal and 5 of the 8 non-neonatal cases recovered but no claim is made for the efficacy of the drug in preventing deaths due to tetanus. In neonates, death seems to be due to respiratory failure caused by tetanus toxin and the control of spasms does nothing to prevent these deaths. Details are given for each of the 8 non-neonatal cases. *A. B. Christie*

SYMONDS, B. E. R. **Clinical Studies on South Trinidadian Children. II. The Treatment of Neonatal Tetanus.** *J. Trop. Pediatrics.* London. 1960, June, v. 6, No. 1, 9–14, 1 fig. [12 refs.]

20 infants suffering from neonatal tetanus were treated at the General Hospital, San Fernando, Trinidad, between August 1955 and November 1958: 12 children (60%) recovered. Treatment consisted of the administration of 100,000 units of tetanus antitoxin intramuscularly, preceded by hyaluronidase, and the use of either

phenobarbitone 12–24 mgm. or chlorpromazine 5–6·3 mgm. at intervals of 4 to 8 hours. Feeding was either by intragastric tube or by spoon or pipette. No special virtue is claimed for the management described as the object of the study was simply to develop a regime suited to local facilities. *A. B. Christie*

COMBIESCO, D., STURDZA, Nina, RADU, I., SEFER, M. & NICOLESCO, I. Recherches concernant les sources d'infection dans les leptospiroses. [**Preliminary Investigations concerning the Study of Natural Foci of Leptospirosis**] *Arch. Roumaines Path. Expér. et Microbiol.* 1959, Sept., v. 18, No. 3, 361–72, 2 figs. [16 refs.]

This article is a sequel to others by COMBIESCU *et al.* dealing with the incidence of leptospirosis in Rumania [this *Bulletin*, 1957, v. 32, 1151; 1959, v. 34, 334]. Earlier work revealed evidence of leptospiral infection in 10 out of 12 species of domestic animals (ducks and turkeys were negative), but in only 4 out of 30 wild species examined (pond tortoises, 91%; hedgehogs, 14%; *Rattus norvegicus*, 7%; and hares, 1%).

The finding of agglutinins in pond tortoises (see also COMBIESCU *et al.*, *Arch. Roumaines Path. Expér. et Microbiol.*, 1958, v. 17, 245) prompted the authors to investigate other reptiles. Snakes and lizards were included in the present study of 314 wild animals representing 8 genera, which was based on agglutination-lysis (against 12 serotypes, *viz. icterohaemorrhagiae AB, canicola, pomona, hyos, sejroe, hebdomadis, grippotyphosa, australis A, autumnalis AB, bataviae, poi, and ballum*) and on the examination of urine (and kidneys) by dark-ground microscopy and culture. The overall results were as follows:—

Rattus norvegicus (139): seropositive, 40% (mainly with *L. icterohaemorrhagiae* and *L. hebdomadis*). 12 strains were isolated (*L. icterohaemorrhagiae*, 11; undetermined, 1).

The fact that leptospires were seen in, or cultured from, the urine or kidneys of 6 seronegative rats is of interest.

Hedgehogs, *Erinaceus europaei*, (6): 3 were seropositive; and a strain of *L. australis A* (more closely related to the type Muenchen C90 than to type Ballico) was isolated (for the first time in Rumania) from the kidney of one.

Snakes, *Tropidonotus natrix* the common grass snake, (70): 24 (34%) were seropositive, in low titre, against *L. australis A* and *L. poi* particularly, and occasionally against *L. grippotyphosa* and *L. sejroe*.

Lizards (34), *Lacerta agilis* (22), and *L. viridis* (12), all captured at Bucharest: 20 *L. agilis* reacted with *L. autumnalis* (and other serotypes); 10 *L. viridis* reacted with *L. poi* and *L. icterohaemorrhagiae* (and other serotypes).

Pond tortoises, *Emys orbicularis*, (32): all reacted with *L. hyos*, and 14 of them solely with this serotype.

One vulture, 18 land tortoises (*Testudo graeca*), and 18 bats (*Rhinolophus*) were all negative.

Attempts to demonstrate leptospires in specimens from snakes and lizards were fruitless; and cultures were contaminated by *Proteus* and *Klebsiella* organisms. I wise in pond tortoises microscopy, culture, and an inoculation gave negative results from kidney specim but leptospires were seen in cloacal contents from a the 30 animals thus investigated. Contaminants c not be eliminated and attempts to culture t leptospires failed.

The authors conclude that the significance of findings in reptiles cannot yet be defined. *L. H. Turn*

DALAL, P. M. **Leptospirosis in Bombay. Repor Five Cases.** *Indian J. Med. Sci.* 1960, Apr., v. No. 4, 295–301. [44 refs.]

The author remarks that authentic records of hu leptospirosis in India, with bacteriological proof of diagnosis, are few. He gives the case histories of 5 j diced patients, together with results of tests for liver kidney function. The diagnosis was based on agglu tion tests [the number of serotypes used is not sta which showed titres of 1 in 300 or higher with *Leptos icterohaemorrhagiae* and *L. canicola*.

Isolation of the causative organism from the b was, it seems, not attempted and the author states this is very difficult. [In fact, it is well worth whil try to isolate the organism in the first week of illn Identification of the infecting organism by serolog typing of the isolated strain is easier than indi attempts by means of agglutination and cross-aggluti absorption tests on the patients' sera—which were carried out in these cases.]

The remainder of this paper consists of a brief ger discussion of leptospirosis. *L. H. Turn*

RAJASURIYA, K., SOMASUNDERAM, M. & NAGARATNAM **Leptospirosis in Ceylon.** *J. Trop. Med. & H* 1959, Sept., v. 62, No. 9, 205–10. [34 refs.]

This paper is the first published record of proved c of human leptospirosis in Ceylon. Leptospires v demonstrated in guineapigs inoculated with urine fro patients; but the strains were not identified. Pos complement-fixation tests (with antigens prepared f *L. icterohaemorrhagiae* and *L. canicola*) were obtained in these patients.

The difficulties in differential diagnosis are mention the clinical picture of leptospirosis in the tropics is o not typical [of Weil's disease], and laboratory diagn is of necessity slow, even if it is available.

Earlier work suggests that leptospirosis is rare in h rats in Ceylon. The authors conjecture that hu infections may be more common in rural areas bec of the prevalence of animals which have been show be reservoir hosts in neighbouring countries.

They advocate the study of human subjects animals in rural areas in an attempt to define the dence and epidemiology of leptospirosis in Ceylon. [work has already started.] *L. H. Turn*

LTON, Mildred M., HIRSCHBERG, Nell, MENGES, R. W., HINES, M. P. & HABERMANN, R. **An Investigation of Possible Wild Animal Hosts of Leptospires in the Area of the " Fort Bragg Fever " Outbreaks.** *Amer. J. Pub. Health.* 1959, Oct., v. 49, No. 10, 1343–8. [13 refs.]

n the summers of 1942–44, outbreaks of a febrile ill- s occurred among military personnel at Fort Bragg, rth Carolina; and this condition was known as pre- ial, or Fort Bragg, fever until the cause was established 1950 as *Leptospira autumnalis* [this *Bulletin,* 1953, 28, 115].

The authors report the results of a study of 89 wild mals trapped at Fort Bragg, which it was hoped would dicate the source of *L. autumnalis.* The animals luded 41 foxes (3 species), 22 raccoons, 3 opossums, 3 bbits and 20 rodents (5 species). The methods of amination were serological, culture of urine and of dney material, and histology of kidney sections. Sera re screened by the macroscopic slide agglutination test th 4 pooled antigens representing 12 serotypes: posi- e sera were then examined by the microscopic aggluti- tion test with both live and formalinized antigens. gative cultures were examined at intervals for two nths before they were discarded.

L. autumnalis was not isolated [nor was there, it seems, y real serological evidence of it]. Leptospires were lated from 11·7% (10 of 84) of animals thus studied: *australis* 3; *L. grippotyphosa* 7. These were obtained m red foxes (2 of 13), grey foxes (3 of 25) and ccoons (5 of 22).

This is the first report of the occurrence (in the U.S.A.) these two serogroups in the grey fox, and of lepto- irosis in the red fox.

In 12 animal groups homologous antibodies were und in those with positive cultures; antibodies to *llum* (1 in 28) in a kit fox, to *pyogenes* (1 in 256) a raccoon, both with negative cultures.

Agglutinin-absorption studies indicated that the *L. ustralis* isolates belonged to the Ballico group; but the glutination titres with Ballico antigen were low (1 in 4) in 2, and one was negative (but reacted at 1 in 64 ith Esposito antigen). All 3 reacted (1 in 32 and 1 in 5) with another antigen (Fudge) in the same group. By ntrast, most of the homologous titres in animals from hich *L. grippotyphosa* was isolated were high (1 in 048, range 128–4096). *L. H. Turner*

LEXANDER, A. D. **The Distribution of Leptospirosis in Latin America.** *Bull. World Health Organization.* Geneva. 1960, v. 23, No. 1, 113–25. [Numerous refs.]

VOLFF, J. W., HEIRMAN, A. L. & BOHLANDER, H. J. **A Survey of the Occurrence of Leptospirosis in a Dairy Herd in the Republic of Panama.** *Trop. & Geograph. Med.* Amsterdam. 1960. Mar., v. 12, No. 1, 82–90. [20 refs.]

PATHY, M. S. **Infection with Different Species of Leptospires in Husband and Wife.** *J. Clin. Path.* 1960, Mar., v. 13, No. 2, 165–7. [11 refs.]

The man and his wife concerned in this account had both cleaned up the excreta of a puppy during a period of 4 months. About 2 months after acquiring the (one-month-old) pup, the wife was sick with " gastric flu " for 2 weeks, and was not well for a further 3 weeks. She was not admitted to hospital. Some 3 months after the wife fell ill, the husband was admitted to hospital and was investigated for leptospirosis. The wife was then diagnosed retrospectively, by serological tests, as having been infected with *Leptospira canicola.*

Repeated serological examinations in the case of the husband showed a parallel behaviour of the titres against *L. icterohaemorrhagiae* and *L. canicola* which were 1/300 at the 8th day of disease, rose to 1/1,000 after a further week and remained at that level for at least 2 months before reverting to 1/300 at the 6th month at which level they remained for at least another 6 months. *L. icterohaemorrhagiae* was finally incriminated by means of cross-absorption tests. The 2 adult children who had not dealt with the pup's excreta were serologically negative.

19 days after admission (26th day of disease) the man complained of pains in the chest. There were clinical and radiological signs of consolidation at both bases. No pathogenic organisms were found in the sputum, no cold agglutinins were demonstrated in the serum, the erythrocyte sedimentation rate was 20 mm. in the first hour, and the leucocyte count was 4,000 per cmm. (polymorphs 64%, lymphocytes 27%, monocytes 9%). The cause of this pulmonary complication might have been leptospirosis.

The author briefly reviews the literature on the radiological manifestations of pulmonary lesions in leptospirosis—and suggests that this diagnosis is worth considering when patients with an occupational risk of contacts with rats present with acute chest signs.

L. H. Turner

BURGDORFER, W. **The Possible Role of Ticks as Vectors of Leptospirae. II. Infection of the Ixodid Ticks,** *Dermacentor andersoni* **and** *Amblyomma maculatum,* **with** *Leptospira pomona. Exper. Parasit.* New York. 1959, Oct., v. 8, No. 5, 502–8, 1 fig.

The author has shown that *Leptospira pomona* can survive in, and be transmitted experimentally by, an argasid tick *Ornithodoros turicata* [this *Bulletin,* 1957, v. 32, 442]. Since then leptospires have twice been isolated from ticks: (1) *L. grippotyphosa* from *Dermacentor marginatus,* off cattle in the U.S.S.R., by KREPKOGORSKAIA and REMENTSOVA [this *Bulletin,* 1958, v. 33, 180] and (2) *L. canicola* from *Rhipicephalus sanguineus,* off a hedgehog in Israel, by VAN DER HOEDEN [*Ibid.,* 1959, v. 34, 943]. This paper records experiments to determine the role of two other species of tick, both common parasites of livestock, as vectors of leptospires.

After they had fed on a culture of *L. pomona,* ticks of both species became infected. Leptospires were observed in the haemolymph of 23 (53%) of 43 *Dermacentor andersoni* at the 50th day, and in 14 (77%) of 18 *Amblyomma maculatum* at the 25th day. Both species were capable of transmitting the organisms to weanling guineapigs 14 days after they had fed on the culture. (Leptospires were also observed in the salivary glands, central ganglion, and genital system, but not in developing egg follicles.)

After ticks had fed on infected hamsters, however, leptospires did not survive more than 10 days, presumably because insufficient organisms were ingested for a permanent infection to be established.

The author concludes that *D. andersoni* and *A. maculatum* are unlikely to become vectors of *L. pomona* in nature since the level of leptospiraemia in infected domestic animals is much lower than that observed in the experimentally infected hamsters. *L. H. Turner*

MURASCHI, Thelma F. **A Simple Screening Test for the Detection of Leptospirosis in Human Beings and Animals.** *Amer. J. Pub. Health.* 1959, Aug., v. 49, No. 8, 1074–8.

The latex-agglutination (LA) test described in this paper is based on an antigen consisting of a mixture of pooled leptospiral suspensions (formalinized), a standardized suspension of polystyrene latex particles, and glycine buffered saline. The leptospiral suspensions used (*L. icterohaemorrhagiae, L. pomona,* and *L. canicola*) were those most frequently met with in the author's practice. The latex-leptospiral antigen suspension remains stable for 2 years. The test is performed in tubes and is read with the naked eye after 90 minutes' incubation.

The sensitivity of this screen test was compared with agglutination-lysis and microscopic agglutination tests on 3 categories of sera: (1) paired specimens from 25 human subjects from whom the infecting serotype had been isolated and identified, (2) single specimens from 4 persons with serologically confirmed clinical leptospirosis, and (3) positive specimens from 7 dogs (*L. canicola*), and 98 cattle (*L. pomona*).

The specimens from all the dogs and all the cattle were positive in the LA screen test. The test failed to detect antibody in 5 out of 16 persons with *L. australis A* or *B* infections, but in 3 of these positive results were obtained when the homologous leptospire was substituted for *L. canicola* in the antigen suspension. There was insufficient serum to retest the others.

The specificity of the test was determined on sera from 200 healthy persons (3 positive in low dilution) and 25 syphilitic subjects (none positive).

The author claims that the advantages offered by the LA test are its simplicity, rapidity of performance, and the use of a stable non-infectious antigen: she also notes that the test is equally well suited to titrations of serum with individual serotypes. [The advantages mentioned are equally applicable to the sensitized erythrocyte lysis (SEL and HL) tests and a comparison with these would be interesting.] *L. H. Turner*

WHITE, F. H. & RISTIC, M. **Detection of *Lepto* *pomona* in Guinea Pig and Bovine Urine Fluorescent-Labeled Antibody.** *J. Infect.* 1959, Sept.-Oct., v. 105, No. 2, 118–23, 2 figs.

Previous applications of the fluorescein-labelled body technique of COONS and KAPLAN [this *Bul* 1950, v. 25, 730] in the study of leptospirosis reported by SHELDON [*Ibid.,* 1954, v. 29, 615] an MOULTON and HOWARTH (*Cornell Vet.,* 1957, v. 47, The former detected *L. icterohaemorrhagiae* in m lesions of a patient with Weil's disease; the latter de strated *L. canicola* in hamster kidneys.

The present report deals with the detection o *pomona* in the urine of experimentally infected gu pigs and cattle by means of this technique which authors claim, is more sensitive and efficient than c field microscopy. The technique possesses inhe advantages over cultural and conventional serolo procedures in the diagnosis of leptospirosis, especiall the carrier state. Apart from the saving of time, chief advantages are that the leptospires retain characteristic morphology after being thus specifi stained and after concentration by centrifugation. M over, infected urine was found to be suitable for te after 2 weeks storage at room temperature (appr mately 28°C.) provided it was collected in 0·85% soc chloride solution buffered at *p*H 7·4 and formalinize 0·8% (9 ml. urine to 1 ml. buffer).

Fluorescein-labelled antibody to *L. pomona* was fo to stain *L. canicola, L. icterohaemorrhagiae,* and *sejroe*; but work is in progress to determine whether reaction can be made more serotype-specific.

[Full details of the techniques involved are give the original article.] *L. H. Turn*

RUSSELL, R. W. R. **Clinical Features of Trop Leptospirosis.** *Ann. Trop. Med. & Parasit.* 1 Dec., v. 53, No. 4, 416–20. [19 refs.]

This paper records the clinical and laboratory find in 55 patients with *non-jaundiced* leptospirosis in Ma in whom the diagnosis was proved by blood cultur serologically.

The author remarks that milder (clinical) types leptospirosis may easily escape detection and consi the following clinical features to be of particular d nostic value: muscle tenderness, conjunctival injec pharyngeal inflammation, skin rash, and minor haem hagic episodes. The conjunctival injection affects scleral and conjunctival vessels. In the throat a bi red velvety hyperaemia, occasionally petechial, affects soft palate and pharynx without much tonsillar enla ment. Haemorrhages occurred in 30% of the pre cases: sub-conjunctival 11 cases; epistaxis 7; haem tysis 6; haematemesis 3; and melaena 1.

Neck rigidity was severe in 6 patients: the CSF clear, under increased pressure, and contained an ex of lymphocytes (range 10–300 per cmm.). 3 patients neurological complications; in 2 a painful neuriti the shoulders and in one a myelitis of Guillain-B type.

Hypotension was a feature in 21 of 24 patients stu

om this aspect (systolic readings consistently lower than 5 mm.Hg persisting for weeks into convalescence). stural giddiness was the only symptom and no treatent was necessary.

The author states that the total and differential leucote count is usually normal in anicteric cases.

Proteinuria, with or without granular casts, is found in most every case, appearing about 4th–6th day of illss. Some rise in blood urea is common (19/51 cases) d is associated with hypotension and, perhaps, mild guria. Anuria and severe azotaemia can occur in nonndiced patients, and the prognosis is then more seris. The wide variation in the extent of kidney damage n be accounted for by the direct action of the leptoirae and by the effect of circulatory changes which cur. Leptospiral nephritis probably accounts for pronuria; hypotension and salt depletion cause reduced nal blood-flow which results in oliguria and a slight e in blood urea. Occasionally hypotension may be vere enough to cause tubular necrosis.

Tests of liver function in this series gave mainly rmal results (as other workers have noted).

While blood culture was successful in less than 50% of ses (possibly because it was attempted only once, on mission) complement-fixation gave correct results in % and agglutination tests in 91% of cases.

[This is an informative paper which deserves to be dely read. Anicteric leptospirosis may be more comon than is generally supposed in those countries where tention had yet to be focussed on this possibility.]

L. H. Turner

OYD, D. H. A. **Leptospirosis canicola presenting as Pneumonia.** *Brit. J. Dis. Chest.* 1960, Jan., v. 54, No. 1, 91–2, 2 figs. on pl.

This paper describes the case history of a 41-year-old al miner, the salient feature of whose illness was the rly development (day 2) of unproductive cough with llness to percussion, diminished air entry, and crepitions at both lung bases. During treatment with oral nicillin there was transient improvement; later, chlorracycline was given without effect. A chest radioaph, taken when the patient was admitted to hospital ay 8), showed patchy opacities mainly in both lower nes: the erythrocyte sedimentation rate (Westergren) as 21 mm. in one hour; and the leucocyte count was 300 per cmm.

On day 9 the patient developed nuchal rigidity and njunctival injection. The cerebrospinal fluid, which ntained 244 cells per cmm. (neutrophil polymorphs, %; lymphocytes 19%) was sterile; and the protein, gar, and chloride contents were normal.

Crystalline penicillin (8 mega units daily) was given om day 9 for 2 weeks. The patient was afebrile in 48 urs and made a rapid and complete recovery. The est radiograph showed clearing of the opacities after e week.

Leptospires were not isolated, but the agglutination res for *Leptospira canicola* rose from 1/30 to 1/30,000 ring the illness. The patient's dog was found to be creting *L. canicola* in its urine. None of the patient's mily became infected.

The author notes that pneumonia has not been demonstrated radiographically in canicola fever (although it is a recognized complication of severe forms of leptospirosis) and assumes that in this case it was due to *L. canicola.* *L. H. Turner*

OLSUF'EV, N. G., PETROV, V. G. & SHLYGINA, K. N. **The Detection of the Causal Organisms of Erysipeloid and Listeriosis in Stream-Water.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1959, v. 30, No. 3, 112–19. [Translated from Russian.]

This is an account of the contamination of stream-water with the organisms of erysipeloid-listeriosis in which the source of the contamination was traced to infected water voles; the organism was isolated directly from the stream-water and also from the voles. From some of the specimens examined the stream-water was additionally contaminated with *Brucella tularensis.* The organisms of erysipeloid-listeriosis may often also be found in stacked straw and it seems possible that such stacks near the water may have been the original source of the infection described here. *H. J. Bensted*

VIRUS INFECTIONS

The order in this section is:—*General, Psittacosis-Lymphogranuloma group; Pox group; Respiratory group; Reovirus groups; Enteric group; Arthropod-borne group; Others.*

DEW, J., MAWSON, K., ELLMAN, P. & BROUGH, D. **Ornithosis in Two Railway Guards. An Occupational Hazard.** *Lancet.* 1960, July 2, 18–19.

It is well known that infection with ornithosis virus, usually inapparent, is common both in the wild pigeons of our cities and in domesticated or homing pigeons; many instances of human infection from this source are on record. The two cases of ornithosis described in this paper were in railway guards who had transported pigeons in their vans and had probably become infected in doing so. In the pigeon racing season the competing birds are often taken to the starting point by rail, travelling in crates in the guard's van; infection with ornithosis virus may be an occupational risk of some railway guards. [The figures given for the rise in titre of the ornithosis test in the first case—" 1/40 to 1/54 in 5 weeks "—must surely be erroneous.] *S. P. Bedson*

HENNEBERG, G., with the technical assistance of Ilse WOLFF & Erika HÖPPNER. Untersuchungen über Psittakose. [**Investigations on Psittacosis**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 179, No. 1, 29–38.

This paper discusses the findings in 3,078 birds (2,573 budgerigars, 293 pigeons and 212 other birds) examined at the Robert Koch Institute, Berlin, from the beginning

of 1953 to mid-1959 for infection with psittacosis virus. Inoculation of mice with a suspension made from the spleens and livers of the birds was relied on for virus isolation. It was found in 229; 8·1% of the budgerigars were positive and 5·1% of the pigeons. *S. P. Bedson*

SĂRĂTEANU, D., NASTAC, E., FUHRER, B., OPRESCU, E. & HUNG, T. Cercetări asupra infecției cu virus ornitozic în R.P.R. [**Investigations on Infection with Ornithosis Virus in Rumania**] *Studii și Cercetări Inframicrobiol.* 1960, v. 11, No. 1, 73–88. [48 refs.] French summary.

In an investigation of the occurrence of ornithosis among breeding flocks of domestic birds in Rumania 5 strains of the virus were isolated from the internal organs of 9 ducks, 2 from 2 turkeys and 1 from 8 geese. The isolations were carried out by the intranasal inoculation of mice and the presence of virus was detected by the examination of stained smears from the lungs. The virus was identified by slide agglutination tests with a standard suspension of ornithosis virus stained with Giemsa and antisera to 3 isolated strains. Complement-fixing antibody to ornithosis virus in titres of 4 or higher was found in 54 (50·4%) of 107 sera obtained in 1958–59 from persons in occupational contact with domestic birds, and a diagnosis of ornithosis was established serologically in 48 (36·9%) of 130 patients suffering from primary atypical pneumonia. *D. J. Bauer*

MUȘETEANU, C. Die Virus-Enzephalo-Pneumonitis des Säuglings und ihre Ätiologie. [**A New Nosological Entity: Virus Encephalo Pneumonitis of Infants and its Aetiology**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 178, No. 4, 426–33, 15 figs. [18 refs.]

Between 1952 and 1957 the author observed 400 cases of interstitial virus pneumonia in young infants, which occurred in epidemic form in 2 districts of Bucharest. The disease was a generalized infection in which the lungs and brain were mainly affected. Colonies of intracellular coccoid and bacillary forms were observed in the histiocytes in smears of the spleen, brain and lungs stained with Giemsa. An infective agent with a similar appearance was isolated from suspensions of the organs by inoculation of 7–10-day fertile eggs into the yolk sac, and was carried through 12 serial passages; it also multiplied in mice after intraperitoneal injection, causing peritonitis with an exudate of mononuclear cells containing colonies of the organism. The agent was considered to be a virus of the psittacosis-lymphogranuloma group. *D. J. Bauer*

WILKINSON, P. B. **Variations on a Theme by Sydenham—Small-Pox.**

This book was reviewed on p. 835.

KANAGARATNAM, K. **Smallpox in Singapore. A Review of Some Epidemiological Features.** *Pub. Health.* 1960, June, v. 74, No. 9, 344–53.

Singapore, which is ringed by territories where major infectious diseases are endemic, relies, for its protection against imported smallpox, on quarantine barriers herd immunity. As experience has shown that possession of an apparently valid vaccination certi does not render the holder immune from smallpox, passengers (the poorer travellers) from infected port detained under observation at the quarantine sta Compulsory vaccination of infants born in the co and of immigrants, together with a number of mass cination campaigns carried out at times of smallpox breaks and the compulsory vaccination of the e population ordered by the Japanese military autho in 1942, must have had some effect on the level of immunity in spite of the well known shortcoming many mass vaccination campaigns.

A small epidemic, involving 10 recognized cases, ing 2 months, with a case fatality rate of 20%, which remained localized, occurred in 1959. The s of infection, without doubt, was an Indian boy age years, from Madras, who developed a rash in the between Penang and Singapore. He was never seen doctor [let alone quarantined]. The first recognized occurred in a Malay woman who lived near the where the boy was housed. Of the 10 patients 5 found as a result of house-to-house searches: 9 from one small area.

It is suggested that the generally satisfactory lev herd immunity boosted by a successful mass vaccin campaign was responsible for the small and loca nature of the outbreak. *J. Pickford Marsd*

COCKBURN, T. A. **Epidemic Crisis in East Paki April–July, 1958.** *Pub. Health Rep.* Wash. Jan., v. 75, No. 1, 26–36, 7 figs.

The epidemic crisis occurred in 1958, and inv smallpox (44,736 cases with 20,444 deaths in 6 mo and cholera (10,438 and 6,684). The public h department was small, but in the face of this dang situation various visiting medical teams (largely fro United States) dropped their other duties to comba epidemics.

Smallpox epidemics have occurred in East Pakist intervals of a few years, and each year recently se million people have been vaccinated—yet this epi occurred, and the deaths were mostly in children 10 years of age. The author describes the organiz set up to provide vaccinators, who were drawn fro doctors and students of the Dacca medical colleges who worked for a bare subsistence allowance. volunteers proved disappointing, except schoolchildr one area, who soon picked up the technique and w well in the villages. The author remarks that " vaccination is not basically a medical undertaking layman's job of organization, propaganda, and log . . . wherever the administrative officers took per charge, the vaccinating was effective, but where were uninterested, the campaigns were failures ".

Cholera was more difficult; teams went to the af villages and much immunization work was done. author discusses the epidemiology of this disease an means taken to prevent it, noting that immunizatio weak barrier. *Charles Wilco*

REK, J. Využití mikroprecipitace v agaru v laboratorní diagnostice neštovic. [**Utilization of Microprecipitation in Agar in the Laboratory Diagnosis of Smallpox**] *Československ. Epidemiol., Mikrobiol., Imunol.* Prague. 1960, v. 9, No. 2, 101–5, 3 figs. & 2 diagrams. English summary (3 lines).

micromodification for the diagnosis of smallpox by diffusion precipitation on slides has been developed. o lines are marked with a grease pencil 3 and 33 mm. n one end of a 26 × 76 mm. slide, and 0·5 cc. of agar llowed to flow between the marks to form a layer nm. thick, in which the required number of wells nm. in diameter are cut. The slide should be pre- ed on the day of use. The appropriate antisera are ced in the wells, followed by the antigens, and the e is then fixed to the lid of a Petri dish and suspended ide down over the bottom half which contains 0·2% malin solution. Precipitation can be observed after minutes, the optimum time of observation being 3 rs. The use of the method with antigens consisting smallpox vaccine and extracts of crusts from vac- ated persons is illustrated in photographs.

D. J. Bauer

RSTEIN, W. & SHELLEY, W. B. **Eczema Vaccinatum as a Complication of Keratosis Follicularis.** *New England J. of Med.* 1960, June 9, v. 262, No. 23, 1166–8, 2 figs. [10 refs.]

The patient, a male aged 18 years, had suffered from rier's disease for half his life. He was said to have n vaccinated when 1 year old [no reference to pre- ce or absence of scar]. 5 days after being in contact h a recently vaccinated child he felt unwell with fever chills, and on the following day he became aware of nerous "vesiculopustular" lesions on the trunk which r involved also the neck and scalp. Vaccinia virus s isolated from these lesions. The patient was treated h compresses of benzalkonium chloride, 1 in 100,000, ally; triacetyloleandomycin "to control secondary terial infection" orally; and gamma globulin 1·5 gm. ly by injection for 8 doses.

The patient recovered, and for a time there was a king regression in the degree of severity of the kera- s follicularis, even in areas which had not been ctly involved by the vaccinia. *J. Pickford Marsden*

EENK, C. Een geval van encephalitis, waarschijnlijk veroorzaakt door herpes-simplex-virus. [**Encephalitis probably due to Herpes Simplex Virus**] *Nederl. Tijdschr. v. Geneesk.* 1960, June 25, v. 104, No. 26, 1242–3. English summary (4 lines).

A 5-year-old boy who had a headache and fever for 5 s was admitted to hospital unconscious. Kernig's n was positive, he had convulsions and tremors and re were other neurological changes. After several eks he recovered consciousness, when he showed asia and paralysis of the right arm and leg and some ree of central facial paralysis, all of which remained 3 months later. A diagnosis of encephalitis was made from the results of an electroencephalogram and other findings. Originally he was thought to be suffering from tuberculous meningitis but no mycobacteria or other bacteria were isolated from cerebrospinal fluid. No viruses were isolated from samples of cerebrospinal fluid, blood and faeces inoculated into tissue cultures, suckling mice and onto the chorioallantoic membrane of the chick embryo. However, the titre of complement-fixing antibody against herpes simplex rose from 0 to 256 during the course of illness though herpes virus was never isolated. The child did not have stomatitis and the only skin lesion was a small dry blister on the upper lip. Although no member of his family had a history of herpes infection, it was common among children in the neighbourhood at the time and some serious cases of stomatitis, eczema herpeticum and of keratitis had occurred. On the basis of clinical findings, complement-fixation results and similarities with other cases quoted, a diagnosis of encephalitis caused by herpes simplex virus was made. *Janice Taverne*

SCHMIDT, J. R. & RASMUSSEN, A. F., Jr. **Activation of Latent Herpes Simplex Encephalitis by Chemical Means.** *J. Infect. Dis.* 1960, Mar.–Apr., v. 106, No. 2, 154–8. [17 refs.]

Latent herpes simplex infection can be activated by stimuli varying from fever and sunburn to allergy and emotional stress. Experimentally, latent infection has been established by injecting virus intracerebrally into partially immunized rabbits, and the latent infection could be transformed into herpetic encephalitis by anaphylactic shock [GOOD and CAMPBELL, this *Bulletin*, 1948, v. 23, 901]. The present authors have produced latent infection by the same method in order to investigate the effect of some chemicals on it.

Rabbits were immunized with herpes virus injected intramuscularly and a month later the same strain of virus was injected intracerebrally. Rabbits which survived or avoided obvious infection and which showed no sign of illness for at least 3 weeks were then injected with the test compound. Pyromen, a pyrogen derived from *Pseudomonas pyocyanae*, injected at intervals to raise the rabbits' temperature 3–4°F. for at least 20 hours, did not precipitate encephalitis, nor did large doses of cortisone acetate or glutathione. However, 6 out of 10 rabbits injected with adrenaline developed encephalomyelitis. Herpes virus, identified by specific neutralization, was recovered from their brains. The virus was considered to have caused the encephalitis because the symptoms of illness and the histological picture were characteristic of herpetic encephalitis. Control rabbits never developed encephalitis spontaneously although virus was isolated from their brains at the end of the experiment.

The authors conclude that adrenaline can activate latent herpes infection and remark that many of the conditions activating the virus in man also stimulate the secretion of adrenaline. *Janice Taverne*

KLIACHKO, N. S. **Results of a Study of Intradermal Inoculation with Live Attenuated Mumps Vaccine in Residential Children's Institutions after Introduction of the Virus.** (Preliminary Communication.) *J. Microbiol., Epidemiol. & Immunobiol.* London. 1959, v. 30, No. 1, 25–32, 2 figs. [Translated from Russian.]

A study has been made of the efficacy of live attenuated mumps vaccine when given to children living in institutions after the beginning of an epidemic of mumps. In a number of instances in which the vaccine was apparently given during the incubation period the subsequent attack of mumps was mild, and there was therefore no apparent contra-indication to vaccination after the onset of an epidemic. In an institution in which vaccination was given after the occurrence of the first cases 15 of 65 (23%) children developed mumps within the first 3 weeks after immunization, compared with 28 of 164 (17%) in an unvaccinated control group, but after 3 weeks the incidence was much lower (1 of 50, 2%, compared with 36 of 136 controls, 26%). In another institution 15 of 42 unvaccinated children (35·7%) developed mumps later than 3 weeks after vaccination, whereas all of 17 vaccinated children escaped infection.

D. J. Bauer

WIDELOCK, D. & KLEIN, Sarah. **Laboratory Analysis of 1957–1958 Influenza Outbreak in New York City. III. Further Seroepidemiological Studies.** *Amer. J. Pub. Health.* 1960, May, v. 50, No. 5, 649–60, 9 figs.

11,000 sera were collected from the Syphilis Serology Laboratory in New York at regular intervals from August 1957 to August 1959. The sera were tested for antibodies against influenza viruses by haemagglutination-inhibition tests. During this period there were four epidemics of influenza as judged by increases in mortality from influenza and pneumonia. When the epidemics occurred there was an increase in the percentage of sera containing antibodies against Asian influenza virus. In the first two waves antibodies appeared in similar proportions of serum samples in all the age-groups tested (15 to over 60 years). Thereafter the percentage of positive sera from older persons dropped between epidemics and rose during epidemics while the percentage of positive sera from young persons fluctuated much less. In correlation with these findings it was noted that the mortality in the first two waves was distributed in all age-groups while in the third and fourth waves it occurred in the older age-groups. [There is additional interesting information summarized in a series of graphs.] [For earlier parts see this *Bulletin*, 1958, v. 33, 928; 1959, v. 34, 1227.] *D. A. J. Tyrrell*

BOGER, W. P., AARONSON, H. G. & FRANKEL, J. W. **Asian Influenza. Persistence of Antibodies and Revaccination.** *New England J. of Med.* 1960, Apr. 28, v. 262, No. 17, 856–60.

Patients in Norristown State Hospital, Pennsylvania, were vaccinated subcutaneously with 500 chicken-cell-agglutinating (CCA) units of monovalent Asian influ vaccine in November–December, 1957 and again in 1958. Just prior to re-vaccination with polyvalent cines in March and April, 1959, 87% of 242 patients 86 years of age) had residual haemagglutination-in tion titres of 1 in 2 or greater; the antibody titre highest in the age-group 51–60 years. There was a 5 and 7-fold increase in the geometric mean of anti titres 2–4 weeks after subcutaneous injection of 40 200 CCA units respectively of Asian influenza virus, tained as a component of the polyvalent material. ever, the intradermal injection of 0·1 ml. of a polyv vaccine containing only 20 CCA units of Asian influ virus failed to produce a significant response. It also shown that 1·0 ml. quantities (500 CCA unit polyvalent vaccines from 6 manufacturers injected cutaneously in the deltoid region of 1,032 indivi (previously vaccinated) produced a local reaction in 26% and, apart from one instance, no systemic react

D. Taylor-Robins

MIKULINSKAIA, P. M. *et al.* **A Study of the Epide logical Effectiveness of Influenza Vaccinatio Kharkov in October 1957.** *Problems of Viro* London. 1959, v. 4, No. 4, 21–5, 1 graph. [T lated from Russian.]

During an A_2 influenza epidemic in Kharkov, Oc 1957, 148,000 people were vaccinated with a fr prepared A_2 liquid vaccine placed into each nostr an atomizer. Of these, 90,935 were kept under obs tion. Many became infected before vaccination and excluded from calculations of the incidence of di among non-vaccinated and vaccinated. The inci of disease in the latter group was 1·5-fold less tha the unvaccinated group at the time of vaccinatio October) and 2·3-fold less in the post-epidemic p (1–15 November). Reactions due to the vaccine investigated in 218 people, of whom 27·5% had reactions (rhinitis; cough) and 9·6% had a ge reaction (fever of 37–38°C. for not longer than 2 or a combination of the two.

[This paper is interesting since it demonstrates scale of the vaccination programme. It is regrett however, that there is no information on the amou virus in the vaccine. The critical reader would also to know to what extent the vaccinated and co groups were comparable.] *D. Taylor-Robins*

SCHULTZ, L., STILLE, W. T., GUNDELFINGER, B. MILLER, L. F. **Combinations of Asian Influ Virus and Adenovirus Vaccine in the Prophy of Respiratory Illness of Navy Recruits (Par** *Amer. J. Pub. Health.* 1960, Apr., v. 50, N 543–50, 3 figs. [21 refs.]

Outbreaks of acute respiratory diseases indisting able from influenza occur frequently in populations as military camps; since they are often prevalent a same time as true influenza, evaluation of influenza cines is often difficult. The commonest aetiolo agents of such outbreaks are the adenoviruses.

n the present paper an attempt has been made to mate the efficiency of combined adenovirus-influenza cine in controlling outbreaks of respiratory disease in roup of some 1,500 naval recruits in a single station. a blindfold trial, men were allocated randomly to one 4 groups—(1) influenza vaccine only; (2) adenovirus cine only; (3) combined influenza plus adenovirus cine; (4) placebo. Monovalent Asian strain influenza cine was employed; the adenovirus vaccine was poly- ent (types 3, 4 and 7).

The period of study (August 1957–May 1958) included arge-scale epidemic of Asian influenza and two well- ined outbreaks of adenovirus infection. Sporadic es of febrile and non-febrile respiratory disease curred over the whole period and both influenza uses and adenoviruses were prevalent throughout.

The febrile illness rates of each group were compared; comparison with the placebo group, the men receiving luenza vaccine alone showed a reduction of rate of %, in the group with adenovirus vaccine alone the rate s 28% less than the placebo group and with combined ccine 68% less. These results are presented as crude es of clinical infection only, not subdivided according aetiology. It is thus uncertain how much of the idual febrile illness occurring in each vaccinated up represents vaccine failure, or how much is due to ective agents other than that in the vaccine given.

The rate of non-febrile respiratory illness was actually ater in the vaccinated than in the placebo group. nether this indicates an ameliorative rather than a otective effect of the vaccines is uncertain since no oratory findings in this category of illness are orted. *Derek Hobson*

ARSTON, R. Q. & VAUGHAN, E. R. **Parainfluenza 3—Assay and Growth in Tissue Culture.** *Proc. Soc. Exper. Biol. & Med.* 1960, May, v. 104, No. 1, 56–60, 2 figs. [11 refs.]

The Mills strain of parainfluenza 3 virus (HA1) was oculated to 9 lines of cells which had been derived ginally from human or rabbit tissue and maintained ce in continuous culture. In cultures of 4 cell lines aques appeared which could be recognized by cyto- hic effect, but in all 9 lines plaques could be detected using haemadsorption [DEIBEL, *Virology*, 1959, v. 8, 2; this *Bulletin*, 1959, v. 34 (1192)]. The plaque assay s used to study the behaviour of the virus. Calf serum s found to contain inhibitory substances, probably ibody. In one non-inhibitory fluid the virus infec- ity had a "half-life" of 10 hours at 37°C. In a tissue ture 90% of virus was adsorbed to the cells in 1 hour. uring the incremental phase of virus growth only 0·1% the infectious virus in a culture could be found in the ernatant fluid phase. *D. A. J. Tyrrell*

KUMI, H., NISHIKAWA, F., SUGIYAMA, T., YAMAGUCHI, Y., NANBA, J., MATSUURA, T. & OIKAWA, R. **An Epidemic due to HA2 Virus in an Elementary School in Tokyo.** *Japanese J. Med. Sci. & Biol.* 1959, Oct., v. 12, No. 5, 307–17, 4 figs. [19 refs.]

An outbreak of acute respiratory illness involving 2 classes in an elementary school near Tokyo was investigated by laboratory methods and found to be associated with infection by type 2 haemadsorption (HA2) virus. The clinical picture resembled influenza except in that cough was more intense and persistent and constitutional symptoms were milder than usually seen in influenza outbreaks. A haemagglutinating virus was isolated from throat washings from 4 of 7 children involved in the outbreak. The virus was isolated by inoculation of throat washings into monkey kidney cultures. It could be propagated both in monkey kidney and HeLa cell cultures without obvious cytopathic effects but giving positive haemadsorption tests and reaching high haemagglutinin titres in culture fluids. Its antigenic constitution was studied by the haemagglutination-inhibition tests which showed that the 4 isolates were closely related to each other and to the prototype strain of HA2 virus. They were unrelated to HA1 virus and showed antigenic similarity with Sendai virus in tests performed with rabbit antisera but not with chicken antisera. Antibody rises against HA2 virus were detected by haemagglutination-inhibition in 4 of 5 children and by complement fixation in all 5 children from whom paired sera were available. The same serum pairs were tested against Sendai antigen showing antibody rises revealed by haemagglutination inhibition in 3 children and by complement fixation in 4 children.

The relationships between HA2 and Sendai viruses and between these and other myxoviruses are discussed. Sendai virus is considered to be distinct from HA2 virus and not to be directly associated with human infections.

[See also ANDREWES *et al.*, this *Bulletin*, 1959, v. 34, 1056; COOK *et al.*, *ibid.*, 1190; ZHDANOV and BURKINSKAYA, *ibid.*, 1960, v. 35, 513.] *H. G. Pereira*

LUO, Huei-Yuan, YÜ, Chung-Hou, WU, Shu-Ch'un & CHANG, Hsüeh-Teh. **Isolation of Adenovirus and Serological Survey for Adenoviral Infections.** *Chinese Med. J.* Peking. 1960, June, v. 80, No. 6, 514–19, 5 figs. on pl.

JOHNSON, R. T., COOK, M. Katherine, CHANOCK, R. M. & BUESCHER, E. L. **Family Outbreak of Primary Atypical Pneumonia associated with the Eaton Agent.** *New England J. of Med.* 1960, Apr. 21, v. 262, No. 16, 817–19.

The wife of the senior author developed primary atypical pneumonia and 15 days later the author also developed it. Serum from the wife showed a rise in titre for both cold and *Streptococcus* agglutinins as well as a 32-fold rise for antibody to the Eaton agent: the husband's blood showed no rise for cold or *Str.* MG agglutinins but a rise from 1 in 10 to 1 in 1,280 for Eaton antibody: the Eaton agent was isolated from his throat washings on the fourth day of illness. Features of the illness were initial upper respiratory symptoms, marked fatigue, X-ray evidence of pneumonitis and long convalescence. *A. B. Christie*

GIORN. DI MALATTIE INFETTIVE E PARASSIT. 1960, Jan.–Feb., v. 12, Nos. 1/2, 3–115, numerous figs. [Numerous refs.] Società Italiana per lo Studio delle Malattie Infettive e Parassitarie—Sezione Lombarda. Convegno Nazionale di aggiornamento sui metodi di studio delle infezioni da virus enterici (Milano 25–26 Novembre 1958). **[National Convention on Methods of Study in Enteric Virus Infections.]**

The convention met on November 25–26, 1958. The first session dealt with the isolation and typing of polioviruses, Coxsackie and ECHO viruses, and the second with techniques relating to plaque formation in tissue cultures.

The third session covered the techniques of examination for neutralizing and complement-fixing antibodies, and the fourth the problem of identifying cytopathic viruses which cannot be typed with poliomyelitis, Coxsackie or ECHO antisera.

The fifth session related to the evaluation and interpretation of laboratory findings on material submitted for diagnosis, and the final session related to various aspects of the epidemiology of these diseases.

The proceedings of this conference consist of numerous short papers, largely on technical findings. They are all in the Italian language, including the discussions which they provoked. It is not possible to summarize them briefly, and those who wish to follow modern Italian trends on these subjects should read them in full.

Charles Wilcocks

MCLEAN, D. M., WALKER, Selma J. & MCNAUGHTON, G. A. **Enterovirus Infections in Toronto, 1959.** *Canadian Med. Ass. J.* 1960, Mar. 26, v. 82, No. 13, 661–5. [32 refs.]

This paper continues the series of valuable reports on viral meningitis and other enterovirus infections from the Hospital for Sick Children in Toronto [this *Bulletin*, 1960, v. 35, 480]. In 1959, 75 children were admitted with a diagnosis of viral meningitis and samples of faeces or cerebrospinal fluid, or both, were examined for the presence of viruses. 18 out of 50 faecal specimens and 19 out of 54 cerebrospinal fluid samples contained viruses and a total of 29 virus isolations were made from the 75 patients. The most common virus was Coxsackie B2, which was isolated from 9 patients, Coxsackie B5 from 3, A9 from 2, B4 from 2 and 1 isolation each of B3, ECHO 6, ECHO 9 and ECHO 14. In addition 9 as yet unidentified agents were isolated.

16 patients suffered from pleurodynia and 10 excreted an enterovirus in the faeces. The viruses isolated were Coxsackie B2 from 3 patients, and B4 from 2; these patients had a rising titre of antibodies during convalescence. Other viruses were isolated but for these the aetiological relationship was not supported by antibody studies. The viruses were COXSACKIE B3 from 1 patient, B5 from 1, ECHO 2 from 2, and an unidentified agent from 1. The authors have previously described (MCLEAN *et al., Canadian Med. Ass. J.*, 1958, v. 79, 789) acute benign pericarditis associated with Coxsackie B5 infection and during 1959 2 additional cases, both ciated with Coxsackie B5 virus infection, were There was 1 additional patient who had a perica friction rub but no evidence for a viral aetiology c be obtained. There were 3 cases of myocarditis stu and from 1 of these Coxsackie B4 virus was isolated there was evidence of an antibody rise in convalesc

During the year 22 cases of paralytic poliomy were seen and all of these excreted poliovirus in faeces: 20 type 1, 1 type 2 and 1 type 3. Poliovirus not isolated from the cerebrospinal fluid of any of t patients. During the same period there were 2 pr cases of non-paralytic poliomyelitis, 1 due to type 1 the other to type 2 poliovirus. Just over half the pat from whom poliovirus was isolated showed a rise in body titre during convalescence, the remaining pat showing high titres in both specimens of serum. 1 the patients with paralytic poliomyelitis had had than 3 doses of poliovaccine (14 had had no vaccine 5 one or two doses). 3 patients, however, all of w yielded type 1 poliovirus, had had 3 or 4 doses of vaccine, the last dose less than 6 months before the o of paralysis. All 3 of these children showed a ris titre to type 1 poliovirus during the course of thei ness and they all had high titres to type 2 in both s mens but only 1 had appreciable antibody titres to 3. During the year there were 11 cases of meni encephalitis which occurred during or shortly afte attack of mumps. 3 of these patients yielded a mu virus by inoculation of cerebrospinal fluid samples monkey kidney cultures. 1 of these patients and 2 o showed a rise in haemagglutinin inhibitory antib during the course of the disease.

[In a recent paper LENNETTE *et al.* [this *Bulletin*, 1 v. 35, 896] draw attention to the fact that mumps v infection sometimes simulates paralytic poliomyel

A. J. Bec

i. JOHNSON, R. T., SHUEY, H. E. & BUESCHER, E **Epidemic Central Nervous System Disease Mixed Enterovirus Etiology. I. Clinical Epidemiologic Description.** *Amer. J. Hyg.* 1 May, v. 71, No. 3, 321–30, 1 fig. [24 refs.]

ii. ——, BUESCHER, E. L., ROGERS, Nancy G., FUN BUSCH, M. J. & OLIU, W. E. **Epidemic Cen Nervous System Disease of Mixed Enterov Etiology. II. Analysis of Laboratory Invest tions.** *Ibid.*, 331–41. [19 refs.]

Detailed epidemiological and virological studies o epidemic of poliomyelitis occurring in Hawaii are sented. 38 patients with paralytic poliomyelitis an with non-paralytic poliomyelitis were studied. 33 o 38 cases with paralytic disease were found to be du type 1 poliovirus but 2 of them were due to Coxsa B2. 1 of these patients had a facial paralysis and other one a paralysis of the right arm and shoulder. paralysis in the second child cleared up rapidly. In these patients the Coxsackie B2 virus was isolated

om stools and from the cerebrospinal fluid and there as a rise in antibodies to the Coxsackie B2 virus. On e other hand neither of the patients showed a rise in oliovirus antibodies. No aetiological diagnosis was ade in the other 3 patients, although 1 of these was creting Coxsackie A9 in the throat but this did not icit an antibody response. 7 different viruses were nplicated in the 39 cases of non-paralytic poliomyelitis viral meningitis studied. An aetiological diagnosis as made in 32 patients as follows: type 1 poliovirus, 4; oxsackie A9, 7; Coxsackie B2, 2; B5, 1; ECHO 9, 16; CHO 15, 1; and a new ECHO type, Crawford, 1. In ldition 3 of the 7 patients in whom no aetiological agnoses were made were excreting viruses, 1 type 1 oliovirus and Coxsackie A9, 1 type 1 poliovirus, and 1 CHO 21, but none of these viruses caused an antibody sponse. The criteria for making an aetiological diagosis were a 4-fold or greater increase in neutralizing ntibody, the isolation of the virus from the cerebroinal fluid in the presence of an unchanging high titre f antibodies to the same type of virus or the isolation f type 1 poliovirus from the stools of a patient with aralytic poliomyelitis. All the virus isolations were ade in monkey kidney cells. The majority of the antiody titrations were performed by using the metabolic hibition tests of SALK *et al.* [this *Bulletin,* 1955, v. 30, 84] but it was found that a few additional serological iagnoses or confirmation of virus isolations could be ade by using a cytopathic inhibition test employing e strain of virus isolated from the patient and addional sensitivity was obtained by prolonging the time of cubation at 37°C. to 3 hours instead of the usual 1 our at room temperature as described by PERKINS *et al. bid.,* 1958, v. 33, 802.]

A. J. Beale

LUDNAI, O. **The 1957 Poliomyelitis Epidemic in Hungary. I. An Epidemiological Study.** *Acta Microbiologica.* Budapest. 1958, v. 5, No. 4, 359–68, 6 figs.

"A poliomyelitis epidemic involving 2,334 cases (23·8 er 100,000) occurred in Hungary in 1957. The epidemic as more extensive in the country (26·2 per 100,000) an in Budapest (13·6 per 100,000). The northeastern art of the country suffered most. County Hajdu-Bihar ad the highest attack rate (88·2 per 100,000). The case cidence, which at the beginning of the year had already een relatively high, began rapidly to rise during May nd attained its maximum in July. The rapid rise of the urve was followed by a sudden fall. The age specific ttack rate was the highest (284 per 100,000) in the group f the one to two years old children. The attack rate as 194 per 100,000 for the infants and 73 per 100,000 or the 3 to 6 year age group. The proportions of the to 6 and 7 to 14 years age groups have increased since 956. The general case-fatality rate was 6·1 per cent. he age specific case-fatality rate for infants exceeded 9 er cent., and decreased with the increase of age until 14 ears of age. The group above 15 years displayed the ighest case-fatality rate."

MOLNÁR, E. **The 1957 Poliomyelitis Epidemic in Hungary. II. An Aetiological Study.** *Acta Microbiologica.* Budapest. 1958, v. 5, No. 4, 369–75, 1 fig. [10 refs.]

"1. Faecal specimens from 65 cases of paralytic poliomyelitis and 134 cases of aseptic meningitis were examined in order to isolate virus.

"2. Sixty-five cytopathogenic strains have been isolated in trypsinized monkey kidney cultures, while only 29 strains were isolated from the same material in fibroblastic cultures of human embryonic skin-muscle cultures.

"3. In monkey kidney cultures 60 per cent. of the paralytic patients' faeces showed cytopathogenicity. Eighty-five per cent. of the strains belonged to type 1, the remainders to type 2 poliomyelitis virus. One specimen yielded both type 1 and type 2 viruses.

"4. Only 19 per cent. of the faeces of patients with aseptic meningitis proved to be cytopathogenic. One half of the strains was type 1 poliomyelitis virus, a quarter belonged to the type 9 of ECHO viruses, the remainders have not been identified.

"5. ECHO 9 virus might have had a causative role in part of the cases of aseptic meningitis."

BLAIR, D. M. **Poliomyelitis: Southern Rhodesia, 1958.** *Central African J. of Med.* 1959, May, v. 5, No. 5, 219–23.

Following the 1957 outbreak of poliomyelitis in Southern Rhodesia previously described by the author [this *Bulletin,* 1959, v. 34, 865], cases occurred throughout 1958 indicating that the disease was still active. The situation in 1958 is reviewed here. The mortality in Africans increased from 4% to 7%, approaching the 10% mortality in non-Africans. More than half the 61 cases in 1958 occurred in the four months February to May. The distribution of incidence between the sexes was even, and between non-African and Africans remained at 1:2 as before. The incidence according to age-groups in non-Africans was consistent with that expected if the 1957 incidence had applied, indicating that large-scale vaccination had had little effect. Among Africans, however, there was an appreciable shift of cases from age-groups under 5 years to those 5 and over, but vaccination was insufficient to have caused this. It may be that in Africans the age distribution and pattern are coming to resemble those in non-Africans. Non-paralytic poliomyelitis was rarely diagnosed in Africans during epidemics and still more rarely at other times.

Poliomyelitis was reported in 8 vaccinated persons of whom 2 had had 3 inoculations and the remainder 2 each. In one case the onset was 14 days after the second inoculation. Among vaccinated non-Africans the ratio of paralytic to non-paralytic cases was 7:1 as compared with a general ratio of 3·4:1, but clinical reports suggested that recovery from paralysis was quicker and more complete than in unvaccinated persons.

T. H. Davey

NATHANSON, N., THRUPP, L. D., HALL, W. J., LANGMUIR, A. D., CORNELL, R. G., FORESTER, Helen E., CHURCH, Ruth E., HALL, J. B., HILDEBRAND, Minna, SHAUGHNESSY, H. J. & MORRISSEY, R. **Epidemic Poliomyelitis during 1956 in Chicago and Cook County, Illinois.** *Amer. J. Hyg.* 1959, Sept., v. 70, No. 2, 107–68, 16 figs.

This is a very detailed study of the outbreak during the summer of 1956. 1,405 cases were investigated by the study unit and 82 others were examined but not included as the final diagnosis was of diseases other than poliomyelitis. The data were analysed by age, sex, race, socio-economic factors, the effects of and the time and method of vaccination, the spread and geographical distribution, severity and sites of paralysis, frequency of encephalitic symptoms, classification by convalescent muscle grade, attack rates among pregnant women, association of bulbar paralysis and tonsillectomy, virus studies, the frequency and use of respirators and tracheotomy in the vaccinated and unvaccinated groups, subsequent cases in a household, the effect of inoculation with diphtheria, pertussis and tetanus antigens within a month of contracting poliomyelitis.

The outbreak in 1956 differed in several respects from preceding outbreaks. The incidence rose to a peak and declined earlier than usual and the number of cases was larger than in recent years. The age distribution shifted from the school to the pre-school children in contrast to the gradual trend to a higher age of attack in the preceding epidemics. Almost 5% of the households experienced multiple cases, a larger value than in previous outbreaks. In previous outbreaks the white population had been attacked more heavily than the non-white but in 1956 the rate for the non-white was over 7 times as high as the rate for the white population. The geographical distribution was different from preceding outbreaks. In contrast to previous experience the areas of low social-economic status had high attack rates.

Many of the differences exhibited in 1956 were due, the authors believe, to vaccination. A larger proportion of the school children had been vaccinated than the pre-school children; in the white population a larger proportion had been vaccinated than in the non-white population; in the better social areas a larger proportion were protected than in the poorer areas. *W. J. Martin*

SELLERS, Margaret I., RASMUSSEN, A. F., Jr. & SCRIMSHAW, N. S. **Poliovirus Infection in Guatemala.** *Amer. J. Trop. Med. & Hyg.* 1960, May, v. 9, No. 3, 304–7.

"The objective of the present study was to determine the frequency of poliovirus infection in Guatemala, primarily the inapparent infections occurring there. Sero-immunity, as indicated by serum neutralization tests in HeLa cell cultures, was demonstrated to all three poliovirus types. Among a group of 100 adults, 76 individuals had antibodies to Type I, 58 to Type II, and 62 to Type III; none of the group was known to have had overt or clinical poliomyelitis. It is concluded that polioviruses prevail in the Guatemalan population to a much greater extent than the occurrence of clinical disease would i cate. It has also been pointed out that 35% of individuals tested failed to show sero-immunity poliomyelitis.

"Poliomyelitis must be taken into account by physician in Guatemala in the differential diagnosi any atypical fever, especially in non-residents. Vacc tion with polyvalent poliomyelitis vaccine is highly d able for foreigners entering tropical and subtropical a and the probability that vaccination will become incr ingly desirable for residents of Guatemala is sugges The risk of paralytic poliomyelitis is greater t commonly realized."

POTASH, L., GELFAND, H. M. & FOX, J. P. **Studies the Development of Natural Immunity to Po myelitis in Louisiana. VI. The Incidence Poliovirus Infections during 1958 as an Ind tion of the Effect of Salk-Type Vaccine on Vi Dissemination.** *Amer. J. Hyg.* 1960, May, v. No. 3, 418–26. [11 refs.]

In previous years the authors have found from a st of the acquisition of natural poliovirus immunity i group of households in southern Louisiana that the i dence of poliovirus infection was not affected by a 2-c course of killed poliovaccine. However, in 1957 t found a strikingly low incidence of poliovirus infect They have adduced evidence [GELFAND *et al.*, *Bulletin*, 1960, v. 35, 478] that makes it very likely t this low incidence was not due to any effect of ki vaccine but instead was due to a natural variation incidence of infection. In 1958 they studied sera f 51 unvaccinated 1-year-old children for antibodies poliovirus and found that these showed a high incide of antibodies to type 2 virus. Since these children not been vaccinated it is concluded that these antibo were due to natural type 2 virus infection and tha subclinical epidemic of type 2 poliovirus infection occurred in the area despite the fact that 70% of children had had killed poliovaccine. This is taken evidence that killed poliovaccine does not establish herd immunity. It is particularly significant that a t 2 epidemic was not prevented since this is the most a genic component of killed vaccine and if vaccine-indu serum antibodies were to limit virus spread it should most easily detected for type 2 virus. Extensive c parisons are presented to show that the children sele in 1958 are comparable in socio-economic status to children studied in earlier years of the south Louisiana experiment. *A. J. Bea*

GENDON, Y. Z. & KHEIT, S. L. **A Study of the Po myelitis Antibody Titre in Donor Sera and Human Gamma-Globulin.** *J. Hyg., Epidem Microbiol. & Immunol.* Prague. 1960, v. 4, No 103–7.

Pooled adult human sera obtained from blood do from several areas of the U.S.S.R. were tested for a bodies to all 3 types of poliovirus. It was found t

e titres for individual pools against all 3 types fluc-ated quite widely but all pools contained antibodies at ast to a titre of 1 in 16 against all 3 types. The mean res were 1 in 100 for type 1, 1 in 97 for type 2 and in 82 for type 3. Similar antibody determinations were rried out on 102 samples of gamma globulin. Again e antibody titres fluctuated quite widely, for example r type 1 from 1 in 100 to 1 in 5120. The mean titres ere 1 in 855 for type 1, 1 in 1560 for type 2 and 1 in 00 for type 3. Approximately 40% of the gamma obulin samples contained antibody titres of 1 in 1000 better against all 3 types of poliomyelitis virus. The sults are compared with those obtained by workers in e U.S.A. The results are very similar in the U.S.S.R. id the U.S.A., although the titres fluctuate rather more idely in the Russian samples. *A. J. Beale*

ERRIS, B. G., Jr., AULD, P. A. M., CRONKHITE, L., KAUFMANN, H. J., KEARSLEY, R. B., PRIZER, M. & WEINSTEIN, L. **Life-Threatening Poliomyelitis: Boston, 1955.** *New England J. of Med.* 1960, Feb. 25, v. 262, No. 8, 371–80, 4 figs. [16 refs.]

This article refers to the treatment during 1955 in 4 oston hospitals of 475 cases of life-threatening polio-yelitis—a term which includes polioencephalitis, bulbar oliomyelitis involving cranial nerves IX, X, and XI, and aralysis of the respiratory or cardiovascular centres. It now largely of historical interest since the techniques f management of respiratory poliomyelitis have been so reatly improved in the last 5 years. Indeed an improve-ent in results with increasing experience was noted even uring this study.

Pulmonary ventilation was largely accomplished by eans of the tank respirator, and positive pressure spiration was employed only in 24 patients. 85% of ie deaths occurred in the first 20 days after admission o hospital. Tracheotomies were done in 112 cases, with 5 deaths [not a very good figure from the present day oint of view]. Neither the mortality rates, nor the rate or success in weaning patients from the respirator, were s favourable as those reported from Los Angeles and ondon [this *Bulletin*, 1956, v. 31, 990], but in these atters many factors are concerned, such as variations in ie training and experience of the teams, in the criteria or placing patients in the respirator, and in the severity f the disease. Of the 218 patients who required respira-ory assistance 68 died (31·2%), and of the two-year urvivors (151), 18 (11·9%) were still in hospital after 2 ears. *H. Stanley Banks*

) KENDALL, E. J. C., BESWICK, T. S. L., MILLER, Ann & TOBIN, J. O'H. **Persistence of Antibody in Adolescents and Adults after a Third, Booster, Dose of Poliomyelitis Vaccine.** *Brit. Med. J.* 1960, June 4, 1689–91, 4 figs.

i) LOGAN, J. S., FIELD, Anne M., MACRAE, A. D., MILLER, Ann & TOBIN, J. O'H. **Persistence of Antibody in Children after a Third Dose of Poliomyelitis Vaccine and their Response to a Fourth.** *Brit. Med. J.* 1960, June 4, 1692–4.

These 2 valuable papers from the Biological Standards Control Laboratory of the Medical Research Council present the results of follow-up serological study on a group of adolescents and of school children who originally had no antibodies to any type of poliovirus and were given a three-dose course of poliovaccine [this *Bulletin*, 1959, v. 34, 736].

(i) The first study details the follow-up examination of 46 public school boys and 8 medical personnel. Serum samples were obtained 2 weeks after the third dose and from 18, 21 or 24 months following the third dose. After 18 to 24 months all the 54 subjects had detectable antibodies to types 2 and 3, 44 still having titres greater than 128 to type 2 and 46 to type 3. The persistence of type 1 antibodies was less good, 29 had antibody titres of less than 65 and 9 of these had no detectable antibodies at a dilution of 1 in 2. The individuals who had responded poorly to the type 1 component in the primary course were those who showed a less good response to the third dose. Thus, 22 had lost their antibody to type 1 by the time the third dose was given. These persons responded relatively poorly to the third dose and by 18 to 24 months later all had antibodies of 1 in 32 or lower and 8 were less than 1 in 2. The rate of fall of antibodies varied markedly from individual to individual but in 18 to 24 months had declined to between 76 and 81% of the original titre for the 3 types of poliovirus. The geometric mean titres after 24 months were 74 for type 1, 186 for type 2 and 178 for type 3. The 8 subjects who failed to respond satisfactorily to type 1 after the primary course and also after the third dose did not respond very well to a fourth dose of 2 ml. of vaccine. In 6 the titre was less than 1 in 128 and in the other 2 was 1 in 128 and 1 in 512. On the other hand, against types 2 and 3, the titres ranged from 1 in 512 to 1 in 8192. Samples of saliva were obtained for antibody titration from some of the persons and 1 out of 21 inhibited type 1 virus, 4 out of 31, type 3 and none out of 25, type 2. The highest titre obtained was 1 in 4 and all the subjects had antibodies to a titre of at least 1 in 2048 against the same type in their serum.

In discussing their results the authors conclude that, in order to maintain a detectable antibody level for 5 years and therefore to ensure a good response to a fourth dose after that interval, a titre of at least 1 in 100 should be obtained with all 3 types. At present, in triple negative subjects, the better commercial vaccines produce this sort of titre in almost all individuals for type 2 and type 3 but only for approximately 70–75% for type 1. The authors also calculate that with the vaccines at present available and assuming 80% of paralytic cases are type 1 infections there will be an 84% protection rate for 5 years after a 3-dose schedule and that if a fourth dose is given this protection would be increased to 95%. At the present time they do not regard a fourth dose to be justified for the whole community. They believe that it is of more importance to encourage those subjects who have only had 1 or 2 doses of vaccine to complete a full schedule of 3 doses [although people who have delayed for too long after a primary course before having their third dose may well already lack antibodies to type 1 and respond correspondingly badly to the booster dose]. A fourth dose of vaccine is, however, desirable for people

at special risk. If killed poliovaccine with a more potent type 1 component becomes available then the problem of a fourth dose before 5 years will no longer arise.

(ii) During the 1956 field trial of inactivated poliovaccine 196 children between 1 and 10 years of age who had no antibodies to any type of poliovirus were tested for their antibody response to 2 doses of vaccine and subsequently the response of 107 of these children to a third dose was studied [MEDICAL RESEARCH COUNCIL, this *Bulletin*, 1957, v. 32, 510; 1958, v. 33, 288]. Now 27 of these children have been tested after a lapse of 2 years from the third dose and the response of 25 of them to a fourth dose has been measured. All the children except for 1 had antibodies against all 3 types of poliomyelitis. 1 child had no antibodies at a dilution of 1 in 16 against type 1 poliovirus. This child responded poorly to the fourth dose and probably had no antibodies remaining to type 1. The rest of the children responded well to all 3 types of poliovirus when given a fourth dose. The geometric mean titres before and after the fourth dose were 1 in 69 to 1 in 1060 for type 1, 1 in 195 to 1 in 1860 for type 2, and 1 in 103 to 1 in 1060 for type 3. The decline in antibody titre in 8 children in the 2 years beween their third and fourth doses was found to be very similar to that recorded in the previous paper, *i.e.* a 4–5-fold drop. 2 of the children showed a rise in titre to 1 type (1 type 1 and 1 type 2) of virus which was probably due to a natural infection. 10% faecal suspensions were tested for poliovirus inhibitors but none of them were found to contain any. This is taken as confirmatory evidence that killed poliovaccine, despite producing high serum antibody titres, is unlikely to affect the spread of poliovirus in the community by limiting alimentary infection [*Ib.d.*, 1957, v. 32, 1031; 1958, v. 33, 1022]. The sera obtained from the children before the fourth dose and after the fourth dose were examined both by the galactose colour test, a modification of the method introduced by SALK *et al.* [*Ibid.*, 1955, v. 30, 184], and by a cytopathic inhibition test. It was found that the actual titres were usually higher by the colour test. This was considered to be due to the larger amounts of serum used to inhibit the same amount of virus and also to the longer time of incubation used for the colour test. Thus, children without antibodies detectable by the cytopathic inhibition test often contained low levels by the colour test and the geometric mean titres were higher, for example with type 1 these were 1 in 69 by the colour test as opposed to 1 in 16 by the cytopathic test before and 1 in 1060 against 1 in 137 after the fourth dose. There was no evidence to suggest that the colour test was detecting low avidity antibodies against poliovirus not detected by the cytopathic inhibition test as has been suggested by SABIN (*Advances in Pediatrics*, 1958, v. 10, 197). *A. J. Beale*

BROWN, G. C. & NAPIER, J. A. **Serologic Status of Children Four Years after Poliomyelitis Field Trial.** *J. Immunology.* 1960, May, v. 84, No. 5, 463–8, 1 fig.

The duration of immunity following killed poliovaccine was estimated by studying sera obtained from participants in the original field trial of vaccine in [this *Bulletin*, 1955, v. 30, 663]. A total of 504 chil who were originally without any poliovirus antibodi 1954 were bled in 1958 and their sera titrated for p virus antibodies. The children were divided int groups each with a different vaccination history. results illustrated clearly the prevalence of natural i tion with poliovirus which can vitiate such follo studies. Thus, in 2 groups of children who either no vaccine or did not develop antibodies to a pri course, it was estimated that 57% had type 1 infec 73% type 2 and 42% type 3. Nonetheless many chil were found to have no detectable antibodies when t in 1958. Thus, of a group of 135 children given a 3- primary course in 1954 and a booster in 1955, 101, and 94 respectively for types 1, 2 and 3 had antibo in 1958 with geometric mean titres of 41, 60 and 2 *A. J. Bea*

LEPOW, Martha L., ROBBINS, F. C. & WOODS, Wilna **Influence of Vaccination with Formalin Ina vated Vaccine upon Gastro-Intestinal Infec with Polioviruses.** *Amer. J. Pub. Health.* 1 Apr., v. 50, No. 4, 531–42, 4 figs. [22 refs.]

The authors have investigated the influence of in vated poliovaccine upon the gastro-intestinal infec with polioviruses by studying the faecal excretion antibody status of contacts of cases of poliomyeliti the years 1954 to 1957. 67 of the families studied at least 1 case of poliomyelitis. In all but 2 of these disease was proved to be due to poliovirus by its is tion either from the patient or from family contacts was found that there was no difference in the incid of virus excretion among vaccinated and unvaccin individuals of the same age. However, it was found older children and adults excreted poliovirus much frequently as a result of family contact. Part of difference may be due to the increased difficulty in is ing poliovirus from adults. Thus, the poliovirus been isolated from the faeces of 89% of cases paralytic poliomyelitis in children under 16 years of and from 72% of adult cases. Also adults may be often infected because they are not exposed to the s dose of virus as the children and this idea gains s support from the observation that poliovirus isolat were much rarer from fathers than from mothers.

As a result the authors conclude that killed p vaccine has little effect upon the spread of poliovir in the community. The incidence of antibodies to 3 types of poliovirus did not differ in the vaccinated f the unvaccinated. Thus, 50% of the unvaccin children and 66% of those who had had 2 doses la antibodies to type 1 poliovirus. Only 7 children had 3 doses of poliovaccine and 2 of these had no detect antibodies. Similar results were found for type 3 p virus but there was some suggestion that the typ component of the vaccine was more antigenic. Howe the authors could find no evidence that heterotypic ty antibodies decreased the likelihood of a type 1 infec

The authors draw attention to 2 deficiencies of t study. First, they make no estimation of the incid of virus in the pharynx and WEHRLE *et al.* [this *Bull*

58, v. 33, 824] have shown that poliovirus can be covered less frequently in the throats of vaccinated ople. Second, they have made very few observations individuals who have had a satisfactory 3-dose course poliovaccine. *A. J. Beale*

INKELSTEIN, W., Jr. **Factors in Participation in the 1954 Poliomyelitis Vaccine Field Trials, Erie County, New York.** *Amer. J. Pub. Health.* 1959, Nov., v. 49, No. 11, 1454–66, 3 figs. [10 refs.]

Who accepts and who rejects the facilities made avail-le to the public through the health and welfare services the community are important questions for workers the public health field. In 1954, during the Polio-yelitis Vaccine Field Trial in New York State, a study acceptors and non-acceptors was carried out in Erie ounty. The vaccine was offered to all children in the st 3 grades (aged mainly from 6 to 9 years) in all the hools in the county. Among the 54,435 children volved, the acceptance rate was 56%.

An analysis of some of the characteristics of those who rticipated and those who did not showed that (1) non-hites participated more than whites; (2) participation clined with increasing age; (3) participation was greater rural and suburban areas than in city districts; (4) rticipation increased with economic status as measured the median monthly rentals of the areas compared;) in the city of Buffalo there was a direct relationship tween participation and the number of years of school-g of the parents, which could, in part, have been due economic factors; (6) there was an inverse relationship tween the extent of participation and the percentage foreign-born persons in the census areas of the lower economic quartiles of the city, but a direct relationship the highest quartile; (7) participation was less in rochial than in public schools; (8) in 28 villages and wnships away from the city there was a direct relation-ip between participation in the immunization pro-amme and the incidence of poliomyelitis in the 2 eceding years.

The implications of these findings both for public alth campaigns and for further research are discussed.

S. P. W. Chave

RITISH MED. J. 1960. June 4, 1729–30. **Mass Immunization with Live Poliovirus Vaccine in the Soviet Union.**

This short article summarizes the impressions of a ecial correspondent who attended the conference in oscow from May 17th to 20th 1960, when the progress the mass attenuated poliomyelitis immunization heme in the U.S.S.R. was reported. After a series of latively small-scale trials, on a few thousand children, ith vaccine prepared in SABIN's laboratory and also at prepared in the U.S.S.R., a "*Blitzkrieg*" against oliomyelitis was launched in 1960. During the first 3 onths of this year about 55 million people, which presents approximately 70% of the population under) years of age, received type 1 poliomyelitis vaccine, 15 illion of these types 1 and 3, and 4 million all 3 types. In addition, 14 million of those vaccinated in the previous year were revaccinated with triple vaccine.

The vaccine was administered in liquid form to children up to 8 months but for adults and older children in the form of sweets. These are round balls of sugar approximately 1 cm. in diameter coated with syrup containing 1 dose of poliovaccine, approximately 10^5 TCD, and finally coated with a coloured sugar-wax layer to prevent drying. They are coloured pink for type 1, violet for type 2, blue for type 3 and white for those containing all 3 types of virus. The vaccine can be stored in this form at −20°C. for 3 months and for 30 days at 5°C. and for 5 days at room temperature. As a result of their extensive programme the Russians are quite satisfied that the vaccine is safe. Sickness in vaccinated people has been no greater than might have been expected in control populations. The method of preparing the vaccine has followed in general the criteria laid down by Sabin.

No trials of the efficacy of the vaccine in preventing disease have been conducted but a number of studies of the serological conversion rate were presented. Conversion rates vary from group to group but average somewhere between 75 and 90% of children originally without antibodies. On the other hand the children who have antibodies respond considerably less well. In one study in Estonia geometric mean titres of 1 in 52, 1 in 162 and 1 in 128 were reported for types 1, 2 and 3. Antibodies appear about 3 to 4 weeks after the administration of the vaccine but as yet there are no data on their persistence. Virus is excreted for 1 to 6 weeks after vaccination and sometimes for as long as 4 months. The vaccine that is excreted spreads to other children in close contact. This is accounted a positive advantage because the attenuated strains may replace the virulent strains in the community. It has also been found, however, that the presence of other enteric viruses interferes with the establishment of attenuated vaccine infection.

Evidence of effectiveness is inferred from the records of the numbers of cases of poliomyelitis in Estonia and Lithuania before and after the introduction of the attenuated vaccine. Thus, in the half year June to December of every year from 1955 to 1958 there were well over 100 cases in both of these countries, whereas in 1959 there were only 8 in Estonia and 17 in Lithuania. 7 of the 8 subjects in Estonia and 7 of the 17 in Lithuania had received living vaccine. Similarly, in Tashkent in 1959 a trivalent vaccine was given in the face of an epidemic and was thought to have accounted for the rapid termination of the epidemic. The results of the Russian experience with attenuated poliovaccine are encouraging. They will be of particular value in the next few years in establishing whether it is possible by these all-out methods to eliminate poliomyelitis.

A. J. Beale

PRZESMYCKI, F., DOBROWOLSKA, H., GEORGIADES, J., OLAKOWSKI, T., STANCZYK, R. & NARUSZEWICZ, D. **Report on Field Trials with Live Attenuated Poliomyelitis Vaccine of Koprowski in Poland.** *Amer. J. Hyg.* 1960, May, v. 71, No. 3, 275–84.

A study of the CHAT strain of attenuated poliovirus carried out in Poland is described. In all 2,888

individuals, mostly children, were administered 2 × 10^5 TCD50 of virus by mouth. It was found that the virus produced no signs of clinical illness in any of the children. The success of infection depended upon 2 factors: one, the age of the individual and, two, whether or not antibodies were present. It was found that 90% of individuals without type 1 antibodies developed these antibodies as a result of vaccine administration and also became excretors of the poliovirus. Spread of virus to contacts was not very frequent. Thus, in a boys' boarding school 72% of the vaccinated individuals excreted virus whereas 17% of their contacts did so. 5 out of 6 boys who were excreting an as yet unidentified virus at the time of administration of CHAT virus were satisfactorily immunized, thus indicating that interference from other viruses in the alimentary canal is not a universal occurrence. The virus did not appear to increase its virulence for monkeys by the intracerebral route after passage in human beings as judged by a study of 11 strains isolated from vaccinated individuals. It is concluded that the CHAT strain of poliovirus is safe to use for mass vaccination programmes and that it is likely to be effective in preventing poliomyelitis although only additional observations can decide whether this hope will be fulfilled. *A. J. Beale*

MARTINS DA SILVA, M. Programas de vacunación con virus poliomielítico vivo atenuado, en América Central y Sudamérica. [**Vaccination Programmes with Live Attenuated Poliomyelitis Virus in Central and South America**] *Bol. Oficina Sanitaria Panamericana.* 1960, Feb., v. 48, No. 2, 93–7.

Vaccination with live attenuated poliomyelitis vaccine of the SM, MEF1 and Fox strains of types 1, 2 and 3 was carried out in 1958–59 on children aged up to 9 years in Colombia, Nicaragua and Costa Rica. The vaccines of the 3 types were given at intervals of 3–4 weeks; 323,453 children received type 1, 354,928 type 2 and 275,691 type 3 vaccine. From the results of neutralization tests carried out on 2,267 children before vaccination 25·8, 24·7 and 29·9% were found to lack antibody to the 3 types of virus respectively. Examination of paired sera obtained from 1,287 children before and after vaccination showed a conversion rate of 87% for types 1 and 3 virus and of 58% for type 2. *D. J. Bauer*

BRODIE, H. R. & MARCHESSAULT, V. **Acute Benign Pericarditis caused by Coxsackie Virus Group B.** *New England J. of Med.* 1960, June 23, v. 262, No. 25, 1278–80, 2 figs. [15 refs.]

"A case of pericarditis in an eight-year-old boy is presented in which Coxsackie virus Group B was isolated from the pericardial fluid. Only 1 other such case can be found in the literature. The occurrence of serosanguineous pericardial fluid in this condition and the pertinent literature are briefly discussed."

REPLOH, H. & PRIMAVESI, K. A. Neue Beobachtur über die Epidemiologie der Hepatitis epidemica den Virusnachweis. [**Observations on the Epide ology of Infective Hepatitis and the Demons tion of the Causative Virus**] *Deut. med. W* 1960, Apr. 29, v. 85, No. 18, 801–7, 835, 7 (5 on 2 pls.) [24 refs.]

The authors have observed an epidemic of infec hepatitis which occurred in Minden, Germany, 1958–59; 145 cases were detected, and 73 patients v treated in hospital. The cases were largely groupe isolated points of high incidence, which were ma communal dwellings with bad hygienic conditions. In tion by contact could be established in 98 cases, in 5 which infection occurred in the home. In the cours extensive attempts to transmit infective hepatitis v to chick embryos characteristic changes were observe the liver which were regarded as being due to spe infection. The lesions consisted of diffuse and f infiltrations with degeneration of the liver epitheli and their presence in embryos inoculated with blood, or stool preparations from patients could be used a diagnostic test. Positive results were obtained in 42 54 (77·7%) clinically confirmed cases of infective he titis and in 2 of 7 patients with other types of jaund the test gave negative results in 29 healthy persons in 10 patients with unrelated diseases. Positive res were still obtained with stool suspensions which had b heated at 100°C. for 30 minutes. *D. J. Baue*

COLOBERT, L., MAITRE, P. & DUFFRENE, A. Hémagg tination des hématies de singe et hépatite infectie [**Haemagglutination of Monkey Erythrocytes a Infectious Hepatitis**] *Ann. Inst. Pasteur.* 19 Oct., v. 97, No. 4 560–70, 4 figs. [11 refs.]

HOYT and MORRISON demonstrated that serum fr patients with infective hepatitis agglutinated red bl cells from *Macacus rhesus* [*Macaca mualatta*] monk [this *Bulletin,* 1957, v. 32, 408]. The present auth have modified the test by substituting red cells fr *Cynocephalus babouin,* which can be kept formoli and they have made the test more sensitive by usin medium containing albumin.

Sera from 273 people who had had infective hepa within the last 6 months were compared with sera fr 110 healthy controls, by means of this test. It found that sera from the first group agglutinated monkey red cells more frequently and to a higher t than sera from the controls, but that many sera w positive although there was no history of recent infecti In individual cases of infective hepatitis, the first se sample taken at the time of appearance of jaundice always strongly positive, and samples taken at 4- intervals showed a declining titre which reached lowest level at 30 days, thereafter remaining constant.

It is suggested that this agglutination test could be u in the diagnosis of infective hepatitis, but only if titre of the serum were followed at intervals during course of illness. The use of one serum sample al would be meaningless in view of the positive res

btained with sera from people having no evidence of cent infection. Such positive results, if specific, may dicate past sub-clinical infection, in which case it is ggested that the test may be of interest to epidemiolo-sts. On the other hand, these results may be non-ecific, perhaps caused by the presence of an antibody the monkey red cells which has no connexion with fective hepatitis. *Janice Taverne*

Morris, J. A. & Nakamura, K. **Evaluation of the Hemagglutination Reaction as a Diagnostic Tool in Infectious Hepatitis.** *J. Lab. & Clin. Med.* 1960, May, v. 55, No. 5, 726–32.

The haemagglutination test with chick red cells (CCHA st) was applied to the sera, suitably prepared, of 20 atients with infective hepatitis. The test gives a nega-ve reaction with normal sera. It was negative in 10 of ie hepatitis patients at all stages of the attack, but in ie remaining half it gave high titres that generally fell low or undetectable levels in convalescence. 6 patients ith glandular fever were also examined, and they owed CCHA results that were indistinguishable from ose in infective hepatitis.

The diagnostic value of the test is thus severely limited. would be increased if an inhibitor could be obtained, irected specifically against the reacting elements in the cute phase of hepatitis only; but attempts to demon-rate such an inhibitor in the sera of patients onvalescent from hepatitis were unsuccessful.

Alan B. Raper

Lima, R. & Rieder, H. Zur gutachtlichen Beurteilung der akuten Virushepatitis und ihrer Folgezustände. [**Acute Virus Hepatitis and its Sequelae**] *Wien. med. Woch.* 1960, June 4, v. 110, No. 22, 474–9. [68 refs.]

In this paper the authors refer to the problems of iagnosis and assessment of prognosis in virus hepatitis. here is in particular discussion of the sequelae of the isease based on the literature and their own experience a hospital in Vienna in which 1,622 virus hepatitis atients were treated in the period 1946–1959. Of these atients 417 have been followed up during 2 years but definite judgment has as yet been made of 43 as they ave not been observed for a sufficiently long time.

The main conclusion is that in 77% of cases full ecovery results within 6 months, in 20% the healing of ie disease is protracted up to 2 years and in 3% chronic sease of the liver remains. The different types of ironic liver damage which may result are fully described id the value of laparoscopic biopsy in securing a efinite diagnosis of the liver condition is emphasized. linical findings and laboratory tests of liver function do ot in most instances give a definite picture of the liver amage.

Stress is laid on the fact that even in mild, subclinical id anicteric cases of virus hepatitis the infection may rogress to hepatic cirrhosis. *M. E. Delafield*

Stokes, J., Jr. **Immunization in Viral Hepatitis.** *J. Amer. Med. Ass.* 1960, Feb. 13, v. 172, No. 7, 652–5.

The author reviews the present state of knowledge concerning immunization against infective hepatitis with gamma globulin. Preparations obtained by cold ethanol fractionation or by zinc precipitation are effective in preventing clinical illness, although the latter preparation may itself cause serum hepatitis. Possible explanations of this anomaly are discussed, and the author favours the hypothesis of the existence of several antigenically distinct strains of hepatitis virus. The prolonged incubation period characteristic of serum hepatitis may be due to the gradual dissociation of a virus-antibody complex, leading eventually to the liberation of infectious virus and the delayed development of hepatitis. *D. J. Bauer*

Baquerizo Amador, L. & Marmol C., Fanny. Demostración de la existencia del virus de encefalomiocarditis en la ciudad de Guayaquil. I. Generalidades. [**Demonstration of the Existence of Encephalomyocarditis Virus in the City of Guayaquil. I. General Review.**] *Rev. Ecuatoriana de Hig. y Med. Trop.* Guayaquil. 1959, Apr.–June, v. 16, No. 2, 83–98. [37 refs.] II. Aislamiento del virus de encefalomiocarditis de un caso humano fatal. [**II. Isolation of Encephalomyocarditis Virus from a Fatal Human Case.**] *Ibid.*, 99–117. English summary. III. Aislamiento del virus de encefalomiocarditis de *Rattus norvegicus* capturado en la ciudad de Guayaquil. [**III. Isolation of Encephalomyocarditis Virus from** *Rattus norvegicus* **caught in the city of Guayaquil.**] *Ibid.*, 118–27. [12 refs.] English summary. IV. Transmisión experimental del virus encefalomiocarditis. [**IV. Experimental Transmission of Encephalomyocarditis Virus.**] *Ibid.*, 128–35. [11 refs.] English summary.

A woman aged 58, resident in Guayaquil, Ecuador, developed an acute non-febrile illness with hypertension, headache, photophobia, sweating, bilateral Babinsky sign and pain in the left iliac fossa. The urine contained glucose and acetone, which was considered to be due to hyperglycaemia of cerebral origin. After 13 days the patient had recovered, but 25 days after the onset of illness a relapse occurred, with headache, neck rigidity, hypertension, pharyngitis, bilateral Babinsky sign, fever, incontinence of urine and coma. 18 days after the onset of the relapse death occurred as a result of irreversible hypotensive shock which was attributed to myocarditis. A virus which was identified as encephalomyocarditis by cross-neutralization tests was isolated in 7-day-old mice from a sample of serum taken from the patient on the 7th day of illness. The same virus was also isolated from the serum of a rat (*Rattus norvegicus*) caught in the city of Guayaquil. The virus could be transmitted to mice by intracerebral, intraperitoneal, subcutaneous and oral infection. *D. J. Bauer*

ROSEN, L., HOVIS, Janet F., MASTROTA, F. M., BELL, J. A. & HUEBNER, R. J. **An Outbreak of Infection with a Type 1 Reovirus among Children in an Institution.** *Amer. J. Hyg.* 1960, Mar., v. 71, No. 2, 266–74. [11 refs.]

An episode of reovirus type 1 infection in a Washington orphanage, Junior Village, which is being studied longitudinally for the incidence of microbial infections in man is described. During a 9-week period from January to March 1957 serological evidence of infection was obtained in 43 out of 73 children. 22 children also excreted virus in anal swabs but only 1 of these had virus in the throat. Virus excretion was observed to persist for 5 weeks. Virus recovery was much rarer in children with prior heterotypic reovirus antibodies although such children showed as high serological evidence of type 1 infections as did children without any reovirus antibodies. 24% of the children without heterotypic reovirus antibodies developed them concurrently with type 1 antibodies. There was some evidence that reovirus infections were associated with mild febrile disease but because of the prevalence of mild illness in these children this conclusion is not secure.

[Dr. Bell and his colleagues are said to have in manuscript their long-awaited account of the general plan and methods of study of the Junior Village population.]

A. J. Beale

LONGSHORE, W. A., Jr.; MEYERS, E. G.; LOOMIS, E. C.; FUJIMOTO, Frances Y.; OTA, Margaret I.; LENNETTE, E. H.; PETERS, R. F. **California Encephalitis Surveillance Program. Introduction** [LONGSHORE]. *Amer. J. Hyg.* 1960, May, v. 71, No 3, 363–7. [15 refs.] **Mosquito-Virus Relationships** [MEYERS, LOOMIS, FUJIMOTO, OTA & LENNETTE]. *Ibid.*, 368–77. [11 refs.] **Mosquito Population Measurement and Ecologic Considerations** [LOOMIS & MEYERS]. *Ibid.*, 378–88, 1 fig. **Relationship of Human Morbidity and Virus Isolation from Mosquitoes** [LONGSHORE, LENNETTE, PETERS, LOOMIS & MEYERS]. *Ibid.*, 389–400.

Introduction [LONGSHORE, pp. 365–367]

The Central Valley of California has long been recognized as an endemic (and occasionally epidemic) area for western equine (WEE) and St. Louis encephalitis (SLE). After an outbreak in 1952 [this *Bulletin*, 1954, v. 29, 922], a surveillance programme was set up (1) to study mosquito populations and their infection-rates, (2) to relate these findings to the occurrence of human disease and (3) to determine whether the behaviour of the infections could be predicted from such data. Information about human cases was obtained by stationing observers in the 4 study-areas who compiled information about patients and arranged the sending of laboratory specimens which are essential for diagnosis. An indication of the incidence of infection was also obtained by study of the number of specimens reaching laboratories for diagnosis of central nervous system infections. Mosquito collections were made in the study-areas from March to October each year. The study-areas were in Kern, Fresno, San Joaquin and Sutter-Y Counties and were spaced along the Central Valle intervals of about 100 miles.

Mosquito-virus relationship [MEYERS, LOOMIS, F MOTO, OTA & LENNETTE, pp. 368–377]

Mosquitoes were hand-caught in artificial resting-pl and kept alive for 24 hours before storage on dry 12 pools of not more than 50 female *Culex tarsalis* examined from each study-area weekly. When insuffic *C. tarsalis* were obtained, *C. pipiens* and *C.* (=*stigmatosoma*) were also examined. WEE was isol from 433 pools of *C. tarsalis*, 2 of *C. pipiens* and *C. peus* in 1953–7: 42% of the isolations were f mosquitoes collected in July and 29% in August. was isolated from 186 pools (*C. tarsalis* and *C. pe* 47% of them in 1954: the peak incidence was in Aug September except in 1957 when it was one month ear Turlock virus was isolated from 155 pools (3 spp.): 4 of the pools were collected in July. California virus not isolated during this study.

Altogether 138,373 *C. tarsalis* were tested in 3 pools and virus was isolated from 764: 10,045 *C.* in 298 pools had only 5% positive and of 10,300 *pipiens* in 257 pools only 1% were positive. minimum infection rate (MIR) is the number of po positive divided by the number of mosquitoes tested: SLE and Turlock viruses all pools positive for W were deducted as WEE kills the mice before the for could cause disease if present in addition. For W highest MIR's were usually in August, for SLE August/September except in Sutter County where t were in July. In each area certain collecting stations higher or lower numbers of mosquitoes or of virus is tions than the average and ecological studies are be made to determine the reasons.

Mosquito population measurement and ecologic c siderations [LOOMIS & MEYERS, pp. 378–388]

Mosquito populations in the study-areas were stud by means of standard light-traps operating from 6 p to 6 a.m., March to October. Attempts were also mad study the ecology of domestic and wild mammals, b and flora in these areas. A gradual decrease in mosq populations was observed from 1954 to 1957. The p population of *C. tarsalis* was annually earlier in Su than in the other 3 areas. Numbers began to increas June and generally decreased rapidly after mid-Sept ber. Sutter and Fresno, in general, had higher pop tions than the other 2 areas. Although the seas population change was parallel in urban, rural, mosqu control and uncontrolled areas, higher densities w found in rural than urban areas, and in uncontrolled r areas than controlled. The possible importance changes in human and domestic animal populations behaviour in the area are discussed. Two collecti stations, one with a high and one with a low mosq population, were compared in detail. The most signific ecological difference between the 2 was considered to the higher bird population in the area with the la mosquito population.

elationship of human morbidity and virus isolation from mosquitoes [LONGSHORE, LENNETTE, PETERS, LOOMIS and MEYERS, pp. 389–400]

Only occasional laboratory-confirmed human cases of 'EE or SLE have their onset before June or after ctober and most occur in July to September (36% in ıly, 38% in August). In most years virus was isolated om mosquitoes 1 or 2 months before the human cases. lthough virus was demonstrated in mosquitoes in nearly very month in which human cases occurred there was o correlation between the proportion of infected osquitoes and the number of cases in the same or llowing month: nor was there a clear correlation etween the size of mosquito population and the num-er of cases. But the year with highest recorded mosquito opulation (1954) together with a high infection rate in osquitoes, was the year with the highest incidence of uman SLE and WEE. MIR as high as 12·3 per 1,000 osquitoes were recorded in months with no recorded uman cases. Kern County had the highest WEE uman case-rate and also the highest incidence in osquitoes of WEE (40% of pools tested).

C. E. Gordon Smith

RZESMYCKI, F., TAYTSCH, Zofia, WRÓBIEWSKA, Zofia & LACHMAYER, Jadwiga. **Investigation of a Natural Focus of Encephalitis in the "Puszcza Bialowieska" National Park.** *J. Infect. Dis.* 1960, May–June, v. 106, No. 3, 276–83. [24 refs.]

An intensive study was made in a Polish national park orest [this *Bulletin*, 1960, v. 35, 165]. Small mammals nd birds were obtained by trapping or shooting. Their ctoparasites were removed. Ticks were collected by ragging flags and mosquitoes by exhausters. Animal loods in pools of 2–3, and brains in pools of 5–10 of he same species were inoculated intracerebrally and ntraperitoneally into 4-week mice as were arthropod uspensions. 3 blind passages were made where neces-ary and isolates were identified by a haemagglutination est with human and sheep cells to exclude mouse ncephalomyocarditis and encephalomyelitis, and comple-nent-fixation and neutralization tests for tick-borne ncephalitis viruses.

2,466 small mammals were tested for virus in 303 pools nd serologically in 1,411 pools. Virus was isolated from rain in 6 of 89 pools of *Clethrionomys glareolus*, 2 of 9 of *Apodemus flavicollis*, 7 of 86 of *Sorex araneus*, 5 of 2 of *S. minutus*, 1 of 10 of *Neomys* spp., 7 of 17 of *Microtus* spp., and 2 of 6 of *Sicista betulina*. Virus was solated from blood of 3 of 27 pools of *C. glareolus*, 5 of 7 of *A. flavicollis*, 2 of 14 of *S. araneus*, 2 of 6 of *Neomys* spp., and 1 of 4 of *S. betulina*. Virus was solated from 4 of 35 pools of 30–100 forest *Aëdes* nosquitoes [? 3 as 1 isolation is in 1956 when none ppear to have been collected], from 2 of 12 pools of *Aëdes* from pasture, from 1 of 20 of *Anopheles* from tables; from 3 of 13 pools of forest *Ixodes ricinus*, from 3 of 16 of *I. ricinus* from pastures, from 1 of 18 of *I. ricinus* from cows; from 2 of 34 pools of 20–30 fleas; but not from 8,000 gamasid mites or from 100 lice.

45 of the virus strains had incubation periods of 4–5 days in mice after passage and 15 strains periods of 2–3 days. 42 of the former were compared by complement-fixation and neutralization tests with 2 strains of tick-borne encephalitis virus (Moscow 256 and Klodobok): 38 were shown to share a complement-fixing antigen with both strains in varying degree while 4 were not. 33 strains were neutralized by both antisera, 7 by one or other, and 2 not [these differ from the 4 by complement-fixation]. The strains with shorter incubation periods have not yet been studied. No strains were shown to agglutinate sheep or chick red cells but 4 agglutinated human cells.

Complement-fixation tests were carried out with tick-borne encephalitis virus on blood and heart extracts: 55 of 1,654 small mammals [? in pools] gave positive results as did 17 of 128 cows, 2 of 159 pigs, and 6 of 77 horses. 16 of 225 small mammals had complement-fixing antibody to lymphocytic choriomeningitis virus as did 4 of 159 pigs—the other species were not tested. A survey of human sera from the area by complement-fixation with tick-borne encephalitis virus was also made on 1,446 sera: 0–16% in different areas were positive.

6 strains of tick-borne encephalitis virus were isolated from 22 human cerebrospinal fluids obtained from hospitals in the area during 1956. *C. E. Gordon Smith*

BIRULA, N. B. & ZALUTSKAYA, L. I. **[The Classification of the Foci of Tick-Borne Encephalitis]** *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 6, 667–75, 8 figs. [16 refs.] [In Russian.] English summary.

The concept of the focal occurrence of infectious diseases has gained wide acceptance in the Soviet Union, the focus being defined as the population of the infective agent together with the population of the natural hosts which keep it in existence, and from which it may be transmitted incidentally to man. The concept of the focus is therefore intimately connected with questions of geography and plant and animal ecology, and in the present work the authors have examined the possibility of classifying foci of tick-borne encephalitis infection on the basis of landscape zones and their subdivisions, the term landscape including the geological, geomorphological and botanical peculiarities upon which the nature of a particular area depends. The authors' contention is illustrated with statistics of the incidence of tick-borne encephalitis in various regions of the Soviet Union and distribution maps of recorded cases. *D. J. Bauer*

NIKIFOROV, L. P. **[Zoologico-Parasitological Investigations of Natural Foci of Tick-Borne Encephalitis in the Tyashin District of the Kemerov Region. Communication I. The Natural Focus, its Appurtenance to a Certain Type of Landscape and the Application of Biocoenological Methods of Investigation]** *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 6, 676–82, 1 fig. [13 refs.] [In Russian.] English summary.

On the basis of field observations carried out in the Tyashin District of the Kemerov *oblast* of the U.S.S.R. the author stresses the importance of the biocenosis, rather than the geographical and ecological features of an area, in the characterization of a natural focus of

infectious disease, with particular reference to tick-borne encephalitis. The focus consists of the biocenosis, in this case infected ticks and their vertebrate hosts, together with the virus, which is thus permanently maintained under natural conditions in those areas where the geographical and ecological conditions enable the biocenosis to exist. *D. J. Bauer*

ČUPKOVÁ, Emilia. Príprava neinfekčného lyofilizovaného antigénu klieštovej encefalitídy pre komplement-fixačnú reakciu. [**Preparation of Non-Infectious Freeze-Dried Tick-Borne Encephalitis Antigen for The Complement-Fixation Test**] *Československ. Epidemiol., Mikrobiol., Imunol.* Prague, 1960, v. 9, No. 2, 106–10. [18 refs.] English summary.

The author has developed a non-infectious tick-borne encephalitis complement-fixing antigen which can be sent out to routine diagnostic laboratories and handled without risk. A suspension of the brains of 9–11 gm. mice or 3-day-old rats infected with the O strain of tick-borne encephalitis virus was irradiated at 4–6°C. in a 1 mm. layer at a distance of 25 cm. from a 700 watt mercury lamp working at 120 volts and 4·2 amperes. Inactivation of the virus was complete after irradiation for 20 minutes. In an investigation of 30 batches of antigen made by this method the complement-fixation titres before inactivation ranged from 16 to 128, and after inactivation followed by storage at −15°C. or freeze-drying the titres were essentially unaffected. No loss of titre was observed in inactivated freeze-dried antigen after storage at 4°C. for 1 year. *D. J. Bauer*

POGODINA, V. V. **Latent Immunization of the Population in Foci of Tick-Borne Encephalitis by means of Fresh Goat's Milk.** *Problems of Virology.* London. 1959, v. 4, No. 4, 43–8, 1 fig. [Translated from Russian.]

A study was made of a focus of tick-borne encephalitis where milk-borne infections were also occurring in the Kemerovo and Sverdlovsk regions. Cattle and goat sera were tested in a mouse intracerebral neutralization test—12 of 15 cows and 34 of 46 goats were positive.

In 28 family outbreaks there were only 8 in which all those exposed to the infected milk became ill. The factors appeared to be the amount of milk consumed, the general health of the consumer and the presence of pre-existing antibody. Persons exposed in such outbreaks but remaining healthy were shown to have significant increases in neutralizing antibody [the neutralizing indices are misprinted in the Table, thus 5,623 appears as 5.623].

Healthy persons and their domestic animals were tested in 3 groups: (1) Owners of goats in the natural focus where families had not been affected and who had probably not been exposed to tick bite: the goats of 14 such owners had neutralizing antibody and 10 of the 14 owners had antibody. (2) Owners of goats who used only boiled goats' milk: the goats of 8 of 11 of such owners had antibody but the only owner who had antibody had goats with no antibody and probably acquired infection otherwise. (3) Owners of cows who drank cows' milk: the cows of 11 of 13 such owners had antibody but 1 owner had a low significant antibody level. importance of raw goat's milk seems to be establishe this focus. *C. E. Gordon Smi*

IYER, C. G. S., WORK, T. H., NARASIMHA MURTHY, D. TRAPIDO, H. & RAJAGOPALAN, P. K. **Kyas Forest Disease. Part VII. Pathological Findi in Monkeys,** *Presbytis entellus* **and** *Macaca radi* **found Dead in the Forest.** *Indian J. Med.* 1960, May, v. 48, No. 3, 276–86, 9 figs. on 3 [15 refs.]

This is a study of monkeys (*Presbytis entellus* *Macaca radiata*) found moribund or dead in the fo in the Shinoga District, Mysore, during the epidemi Kyasanur Forest disease in early 1957. 6 monkeys v autopsied within about 8 hours of death and 16 ot within an estimated period of 12–72 hours. In on *entellus* found moribund the only gross findings v blood-clots in the anus, and moderate swelling pallor of the renal cortex. Histologically the showed degenerative changes in central and midzo cells, including vacuoles and pigment; eosinophil c plasmic inclusions were seen. The Kupffer cells w prominent. In the kidneys there were marked degen tive changes in the tubules. The brain showed pat neuronal changes but no evidence of encephalitis. A *radiata* found freshly dead showed focal necrosis in liver and pigment in parenchymal cells. Kupffer c were prominent and there was a mononuclear exudat the portal radicles. Inclusions were not seen. The ney had early tubular degeneration and focal necr was seen in the myocardium. The brain had fo neuronal degeneration, clusters of microglia and mo ate mononuclear perivascular cuffing. Broadly sim changes were found in the other monkeys although a lytic changes made examination more difficult w increasing time between death and autopsy. Haem rhagic manifestations were seen in 14 of the 22 anim in lungs, kidneys, brain, and adrenals.

Virus has been isolated from blood, spleen liver, ney, heart, skeletal muscle and brain in various anim *C. E. Gordon Smit*

ORMAY, L., ARADI, M. P., NIKODÉMUSZ, I. & LOSONC G. Bewertung der Herdforschungsergebnisse de Ungarn vorgekommenen hämorrhagischen Nephro Nephritis-Erkrankungen. [**Evaluation of the sults of Focus Research of Haemorrha Nephroso-Nephritis Diseases in Hungary**] *Zen Bakt.* I. Abt. Orig. 1960, v. 178, No. 3, 279– 3 figs. [19 refs.]

Haemorrhagic nephroso-nephritis, which had pr ously occurred only in the Far East, was recognized Hungary for the first ime in 1953, and in 1953–55, sporadic and 104 epidemic cases were observed, 11 which were fatal. Most cases occurred between J and September, and arose as small epidemics associa with natural foci of infection in which wild rodents p sumably acted as a reservoir. The foci mostly occur

oak or ash woods with thick undergrowth. Of 596 ild rodents caught in foci of infection 58% were ellow-necked field mice (*Apodemus flavicollis*) and 35% ere bank voles (*Clethrionomys glareolus*). Among 7,705 ctoparasites present on the rodents trombiculid and elapid mites predominated. Attempts to isolate the resumed virus by the inoculation of mice with suspenons of arthropods were unsuccessful. *D. J. Bauer*

ROZDOV, S. G. **The Origin of Biphasic Milk Fever (Data from a Study of a Focus of Infection in the European Part of the U.S.S.R.). II. Serological and Immunological Investigations.** *Problems of Virology.* London. 1959, v. 4, No. 4, 38–43. [Translated from Russian.]

In a study of a focus of biphasic milk fever, viruses ere isolated from human blood (strain F), goat's milk trains K54 and K57) and *Ixodes ricinus* (strain 99) [this *ulletin,* 1960, v. 35, 592]. Strain F was used in intraerebral mouse neutralization tests. Sera from the patient had no antibody on the 3rd day of disease but neutrazing indices of 562, 3,388, and 56,230 on the 17th day, 2nd day and 3½ months after onset. [In the tables the eutralizing indices have been misprinted, *e.g.* 3·388 for ,388.] Over 30 sera taken from other patients 3 weeks o 4 years after onset were also found to have antibody gainst strains F, K57 and 99. Sera from other persons ere negative. Complement-fixation tests were done by sing a lipid-extracted mouse brain antigen. Complement-fixing antibody appears towards the end of the 2nd eek of illness and persists for 5 years. Cross-challenge xperiments in mice showed cross-protection between the strains of virus studied. *C. E. Gordon Smith*

NGELINI, A. Interferencias entre la tosferina, sarampión y poliomielitis en el Distrito Federal. [**Interference between Whooping Cough, Measles and Poliomyelitis in the Federal District, Mexico**] *Salud Pública México.* 1960, Jan.–Mar., v. 2, No. 1, 105–10, 5 graphs.

This paper describes the struggle between various nfections for supremacy among the population aged nder 5 of the Federal District of Mexico. The Federal District contains Mexico City and is separately administered. In the age-group covered, 70% of all cases of whooping cough occur; 65% of measles and 87% of oliomyelitis. It is difficult for epidemics of these diseases to occur simultaneously: it is like 3 different people ishing to use the same telephone. Epidemics may occur n the same year but when they do they are at different mes. This is illustrated by tables and graphs. Measles ccurs in the spring; whooping cough usually in the utumn but sometimes also in the spring; poliomyelitis is ommonest in the summer. When the incidence of whooping cough is high that of measles and poliomyetis is usually low.

In alternate years measles has a high incidence: in the pidemic years the proportion of cases of measles to ose of poliomyelitis was 100 : 13·96; in the non-epiemic years it was 100 : 15·06. In some years 2 separte epidemic waves occur; when that happens the higher the measles wave in the spring the lower the poliomyelitis wave in the summer. If in natural conditions measles can interfere with the virulence of the poliomyelitis virus it is not too bold to think that the same may happen with an attenuated living virus and that it would be unnecessary to use attenuated poliomyelitis virus as a vaccine when measles is prevalent.

The conclusions are that, with the existing seasonal pattern of the incidence of whooping cough and measles, the poliomyelitis virus causing paralysis has access to the under-5 population only in the summer months and that when both measles and poliomyelitis are present in a community poliomyelitis increases in incidence as measles weakens. *Allen Daley*

INGALLS, T. H., BABBOTT, F. L., Jr., HAMPSON, K. W. & GORDON, J. E. **Rubella: its Epidemiology and Teratology.** *Amer. J. Med. Sci.* 1960, Mar., v. 239, No. 3, 363–83, 4 figs. [85 refs.]

The epidemiology of rubella and its effects on the offspring of women infected in the first trimester of pregnancy are exhaustively and authoritatively reviewed. It is possible here to refer only to a few of the main points.

The true incidence of rubella infection cannot be known until serological advances make its recognition specific; large numbers of cases escape recognition because of the transience or absence of the rash and other signs. Owing to increasing urbanization the disease appears to be reaching the population at an earlier age than in previous decades; this trend should be encouraged.

The virus of rubella has been cultivated in monkey kidney tissue but only irregularly maintained, and progress in the laboratory seems meanwhile to be held up. Rubella contracted in the first trimester of pregnancy can cause abortion in about 10% of affected pregnancies, as well as prematurity, cataract in the 5th to 8th week of foetal life, heart disease in the 6th to 9th week with or without patent ductus arteriosus, and deafness from lysis of the epithelium of the organ of Corti during the 8th week.

A prospective enquiry in England [this *Bulletin,* 1959, v. 34, 313] suggested that some 30% of 57 children whose mothers had rubella in the first 16 weeks of pregnancy had some degree of deafness when tests were applied at the age of 4 years. The prospective investigations of the past decade appear to have softened the harshness of the original judgments on the incidence of congenital abnormalities, but this may apply only to gross structural deformities. With more thorough screening and deferment of tests until the children can cooperate, defects of lesser grade are being revealed. It must unfortunately be concluded that as regards purposeful control of the infection, little progress has been made in the last 20 years. *H. Stanley Banks*

BADRAN, A. **Infectious Mononucleosis.** *J. Ministry of Health.* Cairo. 1960, Apr.–May, v. 1, No. 4, 70–85. [64 refs.]

A review.

Bacteriology and Immunity

The order in this section is:—**General; Bacteriostatic and Bactericidal Substances; Bacteria; Rickettsiae; Bacteriophages; Viruses; Immunity.**

Abstracts of papers relating to the bacteriology of plague, cholera, yaws, leprosy and certain other tropical bacterial diseases; of the rickettsial fevers; and of yellow fever, dengue, rabies and certain other tropical virus infections, are published in the TROPICAL DISEASES BULLETIN. *Their titles and page references are cited below in the appropriate sub-divisions of this section.*

GENERAL

JETTMAR, H. M. Turrax-Organbreinährböden. [**Organ Pulp Media prepared with Turrax Blender**] *Arch. f. Hyg. u. Bakt.* 1960, June, v. 144, No. 4, 318–28, 4 figs. [12 refs.]

Attention is drawn to the superiority of media made by incorporating finely disintegrated visceral pulp in agar. Such preparations can be obtained in a few seconds with the Turrax machine and without undue development of heat. These media have been prepared from many viscera but those obtained from liver are particularly suitable. They are favourable for the development of cultures of meningococci, brucellae and diphtheria bacilli. Such media also distinguish between bacteria which give clearing of the natural opacity of the medium in the vicinity of their colonies and others which develop rings of milky precipitation; and a third group which leave the medium unchanged. Among those producing clearing are some staphylococci, *Proteus, Pseudomonas aeruginosa, Serratia* and the group of anthracoid bacilli. Opaque rings are produced by *Bacillus anthracis, B. megatherium* and *B. fluorescens liquefaciens.*

Most pathogenic forms come into the third group. There are many "unclassified" bacteria which may be recovered from soil, etc. and develop the phenomenon of ring formation in these media. *J. W. McLeod*

MACPHERSON, I. A. & ALLNER, K. *L* **Forms of Bacteria as Contaminants in Tissue Culture.** [Correspondence.] *Nature.* 1960, June 18, v. 186, 992.

Tissue cultures are often found to be contaminated with pleuropneumonia-like organisms. The authors suggest that sometimes the contaminants may instead be L forms of common bacteria. Their reasons are: (1) Although serum is usually suspected to be the source of the organisms they were never able to isolate PPLO from many samples of different kinds of sera. (2) When used tissue culture medium was plated on soft meat digest agar with horse serum, tiny colonies grew which on subculture yielded colonies with dense outgrowths of a penicillin-sensitive *Corynebacterium.* In the presence of penicillin the *Corynebacterium* remained in its L form. (3) Experimentally, HeLa cell cultures, which had been cured of contaminants by subculturing several times in medium containing 200 units of neomycin per ml., were returned to the original state of chronic infection by adding either the L form itself or the *Corynebacterium.* The latter persisted intracellularly for 9 days and was detectable in its L form by 6 days.

It is remarked that although L forms were sensitive less than 10 units per ml. of neomycin in bacte plates, HeLa cell cultures sometimes had to be trea with 200 units per ml. for 14 days and through m subcultures before they were completely cured.

Janice Tavern

CHADWICK, P. & SLADE, J. H. R. **Identification Bacteria by Specific Antibody conjugated w Fluorescein Isothiocyanate.** *J. Hygiene,* 19 June, v. 58, No. 2, 147–56, 4 figs. on pl. [20 re

The use of specific fluorescent antibody for the ide fication of certain bacteria has been reported by a nu ber of workers [this *Bulletin,* 1958, v. 33, 508; 1959 34, 299, 988; 1960, v. 35, 701]. This paper is parti larly concerned with the application of the method the early identification of slow-growing organisms, a time when the cultures show insufficient growth to p mit the usual serological methods to be used with s cess. The tests were carried out with *Pasteurella pes Brucella tularensis* and *Br. suis* on micro-colonies wit diameter ranging from 20 to 100μ. Impressions of bacterial micro-colonies were taken on microscope gl cover-slips which were dried, fixed and then stained w the fluorescin-labelled globulins of the appropriate a serum. The preparations were examined microscopica under ultra-violet light. Micro-colonies treated w homologous labelled antisera fluoresced brightly un utra-violet light, and individual bacteria were shar defined. The picture could be readily distinguished fr that obtained with heterologous labelled antisera labelled normal sera. Fluorescein isothiocyanate found to have a number of advantages over fluoresc isocyanate. *H. J. Benste*

PETUELY, F. & LINDNER, G. Kritische Untersuchun über die Darmflora. I. Mitteilung: Die Versch bung der Keimrelation im gramgefärbten Ausstr **[Critical Investigations on the Bacteria of Intestine. I. Unreliability of Determinations Relative Proportions of Gram-Positive and Gra Negative Forms.]** *Zent. f. Bakt.* I. Abt. Orig. 19 v. 177, No. 3, 332–9, 6 coloured figs. on pl. Mitteilung: Die Methode der quantitativen Anal mit Hilfe von fluoreszenzmarkierten Antikörpe **[II. Methods of Quantitative Analysis of Bowel Flora by use of Fluorescent Antibod** *Ibid.,* 340–52, 2 figs. [23 refs.]

I. The principal point made is that Gram-negative cteria are more readily washed away than Gram-positive forms in the course of staining and that to get a liable relative count the heat-fixed film should be vered by a thin film of celloidin.

II. After reviewing the varied and numerous methods hich have been proposed for determining the total mber of bacteria in the bowel, their varieties and lative proportions, the weak points of each are dissed. The indication from the literature is that not ore than 2% of the bacteria visible in direct smear can cultivated [this *Bulletin*, 1959, v. 34, 146].

An altogether different approach is therefore indicated d it is claimed that a much more exact enumeration of y given micro-organism present with others in the ools can be obtained if an effective antiserum is prered to the bacteria in question, and then treated with 0·5% solution of 1-dimethylamino-5-naphthalene sulhonyl chloride, and the serum so prepared is used to ark the appropriate bacteria. These can then be counted nder ultra-violet light and their ratio to the total count determined. The preparation of serum-treated bacrial films and of the optical systems used is described great detail. *J. W. McLeod*

VAHARA, S., KOSHINUMA, K, ISHIZEKI, R. & OBA, T. **Application of Infrared Spectroscopy to the Study of Bacterial Endotoxin.** *Japanese J. Microbiol.* 1959, July, v. 3, No. 3, 331–5, 4 figs.

RCH. BELGES MÉD. SOCIALE, HYG., MÉD. DU TRAVAIL ET MÉD. LÉGALE. 1960, Feb., v. 18, No. 2, 84–163, 20 figs. [Numerous refs.] **Reports presented at 4th International Congress of Biological Standardization, Brussels, July 1958.**

This series of papers was presented at the 4th International Congress of Biological Standardization in Brussels in July 1958. 4 of the papers, those of W. L. M. PERRY (pp. 84–90), R. H. REGAMEY (pp. 91–111), D. IKIC (pp. 112–119) and R. HAAS (pp. 120–132), dealt with production control as an effective method of controlling the quality of the finished product. Exact methods of achieving this production control vary from country to country and from product to product. On the one hand control can be exercised by demanding adequate staff and laboratories, with the right of inspection both of premises and protocols, and spot checks on the final product. On the other hand detailed specifications of all ingredients and methods of testing can be rigidly laid down. The first method appeared to gain more support, the second method being deemed too detailed for use by a state-controlled laboratory. 2 other papers presented original work. J. G. FEINBERG (pp. 133–160) gave a very interesting account of the versatility of the agar gel precipitin technique for the assay of antigens. These techniques are likely to be of increasing importance and are simple, economical and accurate both for mixtures and simple antigens. G. HENNEBERG (pp. 161–163) describes a test devised by DRESCHER in which polio and other virus preparations can be assayed by their ability to disperse the agglutination of human group O cells suspended in isotonic glucose. [This test has been published in full, HENNEBERG and DRESCHER [this *Bulletin*, 1959, v. 34, 504]. The reviewer's laboratory efforts to reproduce the results have been unsuccessful.] *A. J. Beale*

BACTERIOSTATIC AND BACTERICIDAL SUBSTANCES; DISINFECTION

The order in this section is:—**General; Antibiotics; Colicines; Other Therapeutic Substances; Disinfection.**

UNIN, C. M. & FINLAND, M. **Restrictions imposed on Antibiotic Therapy by Renal Failure.** *Arch. Intern. Med.* 1959, Dec, v. 104, No. 6, 1030–50, 4 figs. [146 refs.]

Many antibiotics are eliminated largely by the kidneys: renal failure interferes with this and concentrations may then be attained in the blood which can have angerous effects. This paper is a review of the literature on this subject, and particularly of knowledge about he distribution and excretion of different antibiotics nd the effect on this of renal insufficiency. A table ntitled "Factors that determine the Persistence of Antiiotics in Patients with Renal Disease" gives, for 15 ntibiotics, particulars of the mechanism and rate of enal excretion, percentage of dose so excreted, percenage bound to plasma proteins, and "half-life" in the blood of normal and anuric patients. In connexion with some antibiotics, even the usefulness of the artificial kidney in eliminating them from the blood is discussed. It is made clear that stability—reflected in a long half-life in the anuric patient—is an important factor; streptomycin, perhaps the most likely of all antibiotics to cause toxic effects in patients with defective renal function, possesses this to a high degree. Antibiotics from which little need be feared in these circumstances are novobiocin and erythromycin, the former because it is eliminated in the bile rather than in the urine, the latter in part for the same reason and because it has little inherent toxicity. Another factor which has to be considered is whether the antibiotic is itself nephrotoxic. The paper is a valuable guide to an aspect of therapeutics deserving of much more attention than it has sometimes received. *L. P. Garrod*

HEGGIE, A. D. **Incidence of Circulating Antibody to Penicillin in Penicillin Hypersensitivity Reactions.** *New England J. of Med.* 1960, June 9, v. 262, No. 23, 1160–63. [12 refs.]

This paper is from a United States Naval Research Unit, and the clinical material consisted of naval recruits who were given an injection of benzathine penicillin for the prevention of streptococcal infections. Less than 1% had reactions to this injection: the serum of those who had, and of 2 other categories among these men, was tested for capacity to agglutinate penicillin-treated red cells. Of 53 men who had urticarial reactions, 18 (34%) had agglutinin: none was found in the serum of 9 who had reactions not including urticaria. The serum of 70 men who had no reactions to the injection was tested and 3 (4·5%) had agglutinin before the injection, and 6 (8·6%) after it. The third group was of 49 men "excused from penicillin prophylaxis because of a past history of hypersensitivity to penicillin": of these 2 (4·1%) had agglutinin. Titres varied from undiluted to 256, but were generally low, since the highest geometric mean titre, in the first-named group, was only 4·5. [Previous authors have denied any correlation between hypersensitivity and the presence of this antibody. The inconstant association between them found in this study leaves the significance of the antibody more obscure than before.] *L. P. Garrod*

SARKAR, J. K. & LAHIRI, D. C. **Penicillin Inactivation by Sera of Patients previously treated with Penicillin.** *J. Indian Med. Ass.* 1960, Apr. 16, v. 34, No. 8, 306–9. [13 refs.]

The test used in these experiments consisted of adding 2 units of penicillin to 1 ml. of serum, and after 1½ hours diluting serially in broth and inoculating with a standard staphylococcus. By this it is claimed to have been shown that the serum of patients under treatment with penicillin (blood taken 11 hours after a dose), who were also known to have had penicillin before, inactivated a substantial amount (25–85%) of the penicillin with which it was mixed. The serum of patients also under treatment, who gave an uncertain or no history of previous treatment with penicillin, exerted little effect and no effect respectively. The authors are inclined to attribute this effect to penicillinase formed by resistant bacteria the growth of which has been favoured by earlier treatment: the possibility of an antibody to penicillin is also mentioned. [These observations require verification. The explanation suggested for them is fantastically improbable.] *L. P. Garrod*

BOYD, C. E. **The Acute Oral Toxicity of Benzylpenicillin Potassium in the Rabbit.** *Antibiotics & Chemotherapy.* New York. 1960, June, v. 10, No. 6, 376–84, 6 figs. [19 refs.]

FLOREY, M. E. **The Clinical Application of Antibiotics. Vol. IV. Erythromycin and other Antibiotics.**

This book was reviewed on p. 836.

MICHAEL, A. F., GIESEL, R. G. & SUTHERLAND, J. **Chloramphenicol Toxicity in Newborn R** *Antibiotics & Chemotherapy.* New York. 1 June, v. 10, No. 6, 368–70.

"The acute lethal toxicity of chloramphenicol adn stered subcutaneously in newborn rats was found to 14 times the toxicity in the adult rat. The newborn-a differences in toxicity may be related to the enzym inability of the newborn to conjugate and excrete ch amphenicol. The lethal effect of chloramphenicol on human newborn could have been predicted by a st such as this."

KUNIN, C. M., CHALMERS, T. C., LEEVY, C. M., SEBA YEN, Susan C., LIEBER, C. S. & FINLAND, **Absorption of Orally Administered Neomycin Kanamycin: with special reference to Patie with Severe Hepatic and Renal Disease.** *England J. of Med.* 1960, Feb. 25, v. 262, No 380–85, 3 figs. [16 refs.]

Oral neomycin has been extensively used for intest antisepsis in patients with advanced liver disease: paper from Boston and the succeeding paper enq whether, contrary to usual belief, enough of the a biotic can be absorbed to cause toxic effects. The sent authors also studied the absorption of kanamy A single dose of 4 gm. was first given to 6 normal s jects, and the concentration in blood and urine de mined by the *Bacillus subtilis* cup plate method. N mycin was detected in the blood of all 6 (no details g for kanamycin) the average levels being about 4 2 μgm./ml. at 1 and 8 hours respectively. The amo excreted in the urine was 0·6% of the dose of neom and 0·7% of kanamycin. Similar studies in patients hepatic cirrhosis, but normal renal function, who w being treated with 8 gm. daily of either antibiotic sho that an average of 0·5% of the dose of neomycin 1·1% of that of kanamycin was excreted in the ur Concentrations in the blood (details again given only neomycin) were up to 12·5 μgm./ml. In patients both hepatic cirrhosis and renal insufficiency, the a biotic blood levels found were considerably higher (h est found 44 μgm./ml.), and roughly proportional to blood urea. It thus appears that the small amo absorbed may be retained in patients with renal fai and accumulate to reach potentially toxic levels. opinion is expressed that kanamycin is the less nep toxic of the two, and may be preferable in th circumstances. *L. P. Garro*

LAST, P. M. & SHERLOCK, Sheila. **Systemic Abso tion of Orally Administered Neomycin in Li Disease.** *New England J. of Med.* 1960, Feb. v. 262, No. 8, 385–9. [14 refs.]

These authors, from the Postgraduate Medical Sch London, estimated neomycin in the blood of 27 pati with hepatic cirrhosis who were being treated with n mycin by mouth. A tube dilution method was used,

um and standard dilutions being inoculated with a phylococcus resistant to other antibiotics. The daily se of neomycin (not specified in individual cases) arely exceeded " 4 gm. Neomycin was detected in the ood of only 7 patients, after periods of treatment rying from 9 to 140 days: the concentrations found re between 0·15 and 2·5 μgm./ml. in 4 of them, and or up to 40 μgm./ml. in the other 3. All these tients were in severe liver failure, and all had raised ood ureas: 6 of them died. One became deaf, but ether any damage was done to the kidney in addition that produced by the disease itself could not be deterned. The authors discuss whether absorption of neocin is promoted by gastro-intestinal ulceration, and nclude that this had an unimportant if any effect: pacity for renal excretion decides whether the antiotic level rises in the blood. *L. P. Garrod*

DENKÄMPER, H., MEYER-DÖRING, H. & STIENEN, G. Über die chemotherapeutische Wirkung der 3-Cysteinyl-Ascorbinsäure. [**The Chemotherapeutic Action of 3-Cysteinyl-Ascorbic Acid**] *Ztschr. f. Hyg. u. Infektionskr.* 1959, v. 146, No. 2, 185–94. [20 refs.]

This paper begins by advancing some rather obscure asons why a compound of cysteine and ascorbic acid ight be expected to have a protective action against cterial infection, and goes on to describe how 3-steinyl-ascorbic acid was prepared. This substance is stable and not all batches were active. It was tested r inhibitory action on bacterial growth *in vitro* with promising results, concentrations of about 1 mgm./ml. more being required to achieve an effect. Nevertheless, when a single intraperitoneal dose was given to ice, followed by inoculation by the same route 15–30 inutes later with pneumococci, haemolytic streptococci, aphylococci or *Escherichia coli*, the mice appear to ave been protected by the larger doses given (1·25–20 gm.): some batches protected against staphylococcal fection in smaller doses than these and others had no fect. *L. P. Garrod*

CQUADE, A. B. & SUTHERLAND, W. J. A. **An Improved Device for Sampling Bacterial Populations on Blankets.** *J. Hygiene.* 1960, June, v. 58, No. 2, 157–8, 1 text fig. & 2 pls.

The authors have designed a device in which pieces blanket (minimum area 400 sq. cm.) can be sampled r bacterial contamination. The blanket is stretched form a diaphragm across the top of a cylindrical coiner 250 cm. in diameter at the bottom of which is an pen Petri dish of culture medium. The blanket diahragm is now subjected to controlled percussion by ropping onto its upper surface a metal ball weighing 50 gm. from a height of 30 cm. The number of times ie ball is dropped is adjusted by experiment to give a ountable number of colonies on the plate after incubaon. It is claimed that this device gives a more even istribution of colonies than the sweep plate method of LOWERS and WALLACE [this *Bulletin*, 1955, v. 30, 897.] *J. C. Kelsey*

FOTER, M. J. **Disinfectants for Bedding.** *Soap.* New York. 1960, Apr. & May, v. 36, Nos. 4 & 5, 73–6, 103; 127–33, 139–41, 3 figs. [29 refs.]

This is a review of the literature concerning the degree of contamination of bedding and methods for treating it. Little new information is presented, nor are any new conclusions reached. The author does not consider that dry heat alone (or with formalin vapour) at 230°F. (110°C.) is effective. Ethylene oxide and β-propiolactone are thought to be more promising.

Commercial laundering was effective in reducing bacterial counts, but recontamination was common during the later stages of the process. This recontamination could be minimized by the use of germicidal rinses. Domestic washing machines could successfully effect a 99% reduction in the bacterial count, provided the temperature used was above 145°F. (63°C.) or germicides are used in the rinse cycle.

A useful section describes the use of domestic washing machines for the terminal disinfection of bedding known to be heavily contaminated. Detailed recommendations are made for using the disinfectants which are commonly available domestically.

The interested reader should consult MERIVALE [this *Bulletin*, 1960, v. 35, 386] and the Report on Hospital Blankets of King Edward's Hospital Fund for London [*ibid.*, 386]. *J. C. Kelsey*

LENNON, W. J., FURIA, T. E. & ZUSSMAN, H. W. **Unique Soap Bacteriostat.** *Soap.* New York. 1960, Mar. & Apr., v. 36, Nos. 3 & 4, 51–4, 93; 56–8, 109, 8 figs.

The substance which is the subject of this paper is 3, 5,3,4′-tetrachlorosalicylanilide, patented by the Geigy Chemical Corporation, on whose staff the authors are, and available as Irgasan BS 200. It is an odourless and tasteless crystalline white substance, " sparingly " soluble in water, but much more so in alkali and other solvents, and stable to most things except strong sunlight. Its minimum bacteriostatic concentration, compared with that of other competitive substances such as hexachlorophene, is stated for 26 species of fungi, among which 3 *Aspergillus* species are far more resistant than others in this and other genera, and for 11 species of bacteria, among which Gram-positive are much more susceptible than Gram-negative. In concentrations up to 0·5% in soap, etc., as indicated by " repeated insult patch tests " and clinical use, the substance is non-irritating to the skin. The use of a soap containing it causes a progressive reduction in the numbers of bacteria recoverable from the hands by the Price washing test, this reduction being greater than that produced by hexachlorophene. It is adsorbed on the skin and fluoresces in " black light ", which is useful for " checking protection " in hospitals and as a " visual demonstration for commercial exploitation."

An all male panel used a soap containing it for one axilla and another soap for the other, and each " rated the armpits of his dress shirt or undershirt for odour ": a majority pronounced in favour of the medicated soap. Other uses suggested are in shampoos for dandruff, and

as an ingredient in solutions used in laundries: information is given about the degree of adsorption on different fabrics and the antibacterial properties conferred on them. *L. P. Garrod*

Beckett, A. H., Patki, S. J. & Robinson, Ann E. **The Interaction of Phenolic Compounds with Bacteria. Part III. Evaluation of the Antibacterial Activity of Hexylresorcinol against** *Escherichia coli*. *J. Pharmacy & Pharmacol.* London. 1959, July, v. 11, No. 7, 421–6, 2 figs.

Van Erven-Mok, D. J. Inactivering van verschillende virussoorten door enige gebruikelijke desinfectantia bij kortdurende inwerking. [**Inactivation of Various Types of Virus by Conventional Disinfectants during Short-Term Action**] *Nederl. Tijdschr. v. Geneesk.* 1959, Oct. 10, v. 103, No. 41, 2048–51. English summary.

A number of common disinfectants were tested to find one which would inactivate a range of viruses, big and small, within 5 minutes, and which was cheap and irritant and therefore suitable for general use in a laboratory. Of the viruses tested, which included myxoviruses, Russian spring-summer encephalitis lymphocytic choriomeningitis among others, vac was the most resistant to disinfection. The chem were tested by shaking them with the virus suspen and then diluting the mixtures with broth. The vi were sedimented in a high speed centrifuge and r pended in broth before titrating.

Only 5% lysol and 10% Citopogen were foun inactivate all the viruses, including vaccinia, in 5 utes. [Citopogen is a mixture of ethereal oils, napl lene derivatives, soap and alcohol. Its efficienc reduced by only 10% by the presence of egg yolk.] alcohol and quarternary ammonium compounds too minutes to inactivate vaccinia. The latter are expensive and their efficiency is largely reduced by presence of serum.

The author concludes that Citopogen is to be pref to lysol because it is cheaper, does not smell unplea and does not irritate the skin. It does, however, lea fatty residue on glassware. His second choice is alcohol, which although more expensive leaves residue. *Janice Taver*

BACTERIA

The order in this section is:—**Cocci; Donovania; Mycobacterium; Corynebacterium; Haemophilus; Pseudomonas; Pfeifferella; Enteric Organisms; Brucella; Pasteurella; Bacillus; Anaerobes; Spirochaetes; Erysipelothrix; Listeria; Others.**

Brownhill, Lydia & Cameron, J. A. **A Rapid Method for the Preparation of Bacteriophage Suspensions for Staphylococcal Typing.** *J. Lab. & Clin. Med.* 1960, May, v. 55, No. 5, 809–11, 2 figs.

"A rapid method for the preparation of high titer phage stocks has been described. This method utilizes rapid growth of the host under aeration and the addition of phage particles in approximately a 1:1 ratio to bacterial cells. Satisfactory results when 22 phage strains were used are reported."

Mandes, T. C. & Rodríguez, M. A. Estudio epidemiológico de *Staphylococcus aureus* en pacientes extra e intrahospitalarios y personal asistencial empleando técnicas bacteriofágicas. [**Epidemiological Study by Bacteriophage Typing of** *Staphylococcus aureus* **isolated from Hospitalized, Outclinic Patients and Medical Personnel**] *Rev. Latinoamer, Microbiol.* Mexico. 1959, Sept., v. 2, No. 3, 139–52, 1 graph. [20 refs.] English summary.

The authors examined 600 strains from the nasal mucosa, and found that coagulase-positive strains were much more common in the medical personnel than in out-patients or in-patients, though the numbers in in-patients increased after a few days in hospital.

In the out-patients the common phage types 47/77, 53 and 77; in the medical personnel 80/81; in the in-patients 80 and 81 (after 2 weeks in hosp

In 89·3% of strains there was agreement in ferme tion of mannitol and production of coagulase, an 95·3% there was agreement between coagulase pro tion and formation of double zones in egg-yolk Of 47 phage-typable strains, 30 were egg-yolk pos and 17 negative. *Charles Wilcoc*

Pillet, J., Orta, B. & Foucaud, M. Recherches l'individualisation sérologique des staphyloco Étude de la spécificité des types 10, 11, 12, [**Studies on the Serological Identification** *Staphylococcus*. **Study of Types 10, 11, 12 Specificity**] *Ann. Inst. Pasteur.* 1960, May, v No. 5, 701–9. [10 refs.]

The authors have continued their work on the logical types of *Staphylococcus aureus* [this *Bul* 1952, v. 27, 890 and *ibid.*, 1953, v. 28, 663] and report the results of their studies on Hobbs's type 11, 12 and 13 [*ibid.*, 1949, v. 24, 87]. Sera and sus sions were prepared and sera absorbed as in pre studies, with heat-killed organisms which had been and resuspended in saline.

All 4 strains possessed specific surface antigens,

additional presence of antigens of other types was nonstrated. There was a relationship between strains and 9; strains 11, 12 and 8; strains III (Cowan) and

The authors stress that it is important to choose as e strains, strains carrying only, or predominantly the e antigen, if serological typing of staphylococci is to of practical value. *M. Patricia Jevons*

POVICI, Marcela, ALEXENCO, Ecaterina, FILOTI, Aurica & NOVAC, Stela. Distribution des types bactériophagiques des staphylocoques pathogénes en Roumanie. [**Distribution of Bacteriophage Types of Pathogenic Staphylococci in Rumania**] *Arch. Roumaines Path. Expér. et Microbiol.* 1960, Mar., v. 19, No. 1, 103–9. [14 refs.]

The English summary appended to the paper is as lows:—

'The distribution of lysotypes of pathogenic staphyocci in this country was studied under various epiniological circumstances including maternity and other spitals, collectivities of healthy children, subjects in no y connected with hospitals. The strains were isolated m patients suffering from staphylococcal or nonphylococcal infections, and from the nose and throat healthy carriers.

'Lysotyping of 3,834 strains yielded the following ults:—

'In maternity and children's hospitals, among the chilen, mothers with or without staphylococcic infection, d the staff, staphylococci belonging to phage group I, d especially to lysotype 80, were found to prevail.

'In surgical departments for adults, staphylococci onging to phage group III were found to prevail.

'Eighty-seven per cent. of the pathogenic staphyoccus strains isolated from various pathological proses (furuncles, mastitis, phlegmons, abscesses, etc.) in spitals, belonged to lysotype 80, while among those lated from staphylococcal infections outside hospital, more than 61·5% belonged to type 80, staphylococci longing to group II and III were found in 17·5% and 5% of the cases respectively, and 10·5% were typable.

'Among patients displaying non-staphylococcal infecns and outside hospital environments, staphylococci group I occurred at a rate of only 5%, untypable phylococci holding the first place, followed by those group II.

"In collectivities of healthy children, untypable staphyocci were likewise prevailing followed by those longing to group I.

"It results from these data that the distribution of sotypes among staphylococci isolated in our country ring the period 1956–1958, varied according to age, ra- or extra-hospital environments, and to the source the strains (staphylococcal infections or healthy rriers)."

NLAND, M., HIRSCH, H. A. & WALLMARK, G. **Pathogenic Staphylococci isolated at Boston City Hospital in 1958. Phage Types and Antibiotic Susceptibility.** *Arch. Intern. Med.* 1960, Mar., v. 105, No. 3, 383–97, 4 figs.

Strains of *Staphylococcus aureus* isolated from lesions of out-patients and in-patients of the Boston City Hospital during the last 3 months of 1958 were phage-typed and tested for sensitivity to 28 antibiotics, some of which were related.

There were 228 strains and almost all were inhibited by erythromycin and its related drugs within a narrow range of concentrations. Novobiocin was most active on a weight for weight basis. Of the other antibiotics tested neomycin was active against all and chloramphenicol against over 90% strains. Graphs in which cumulative percentage of strains inhibited was plotted against concentration of antibiotic, showed characteristic curves for penicillin, streptomycin, tetracycline and erythromycin—2 ascending limbs, one in the sensitive range and one in the highly resistant range separated by a flat portion. Curves similar to that of tetracycline were shown by 5 analogues of that antibiotic.

The highest proportion of strains sensitive to the 4 common antibiotics were from out-patients and the highest proportion of resistant strains were from patients who had been in hospital more than a week and had received antibiotics. Results were compared with a survey carried out in 1955 which, however, included only strains from in-patients [this *Bulletin*, 1960, v. 35, 286].

There were 53 phage types represented and 31% of strains were type 80/81. No relationship was demonstrated between phage type and type of lesion although strains of group III were most often seen in post-operative wounds and group I strains predominated in superficial lesions. 80/81 strains were resistant to penicillin, tetracycline and streptomycin and a few were resistant to erythromycin.

More than 1 strain was received from 26 patients and the majority of repeat strains were identical with the originals. Differences in antibiotic pattern were seen in repeat swabs from 6 patients, and in 5 of these their organisms were of different phage type from the original. From only 2 patients were repeat strains isolated of the same phage type but showing an increased resistance to an antibiotic (erythromycin). Both patients were being treated with chloramphenicol and erythromycin.

M. Patricia Jevons

KIENITZ, M. & KÜMMEL, J. Der Staphylokokken-α-Antitoxintiter bei Neugeborenen und ihren Müttern. [**The Staphylococci-α-Antitoxin Titre in Newborns and in their Mothers**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1960, July, v. 120, No. 1, 53–61. [40 refs.]

The English summary appended to the paper is as follows:—

"The Staphylococci-α-antitoxin titer was determined in 100 full-term newborns (cord blood) and in their mother (retroplacental blood, venous blood). The results showed a practically identical titer of the retroplacental blood and the venous blood with low average values throughout. On the other hand, 55% of the newborn showed a statistically valid higher antitoxin titer than their corresponding mothers. The results are discussed and compared with those of other authors."

ROBINSON, Ann E., BECKETT, A. H. & DAR, R. N. **The Interaction of Chelating Agents with Bacteria. Part II. Cation Binding and the Antibacterial Effects of 8-Hydroxyquinoline (Oxine).** *J. Pharmacy & Pharmacol.* London. 1960, July, v. 12, No. 7, 385–99, 10 figs.

"The binding of iron, cobalt and manganese ions from their aqueous solutions by viable and heat-killed suspensions of *Staph. aureus* is investigated. Competitive uptake of any two of these metal ions by viable and heat-killed organisms was also studied. The cation binding properties of viable and nonviable suspensions of *Staph. aureus* were compared and discussed. Data for the uptake of metal ions are also discussed in relation to the bactericidal effects of oxine solutions containing an equimolar concentration of iron and similar solutions containing additional iron, or cobalt or manganese."

ROBINSON, J., THATCHER, F. S. & MONTFORD, Jeannine. **Studies with Staphylococcal Toxins. V. Possible Identification of Alpha Hemolysin with a Proteolytic Enzyme.** *Canadian J. Microbiol.* Ottawa. 1960, Apr., v. 6, No. 2, 183–94, 4 figs. [31 refs.] **VI. Some Properties of a Non-Hemolytic Dermonecrotic Toxin produced by some Strains of** *Staphylococcus aureus.* *Ibid.*, 195–201, 3 figs. (1 on pl.) [19 refs.]

V. Culture filtrates were prepared from the growth of strains of *Staphylococcus aureus* on semi-solid medium. Most of the reported work was performed with strain L-16 [this *Bulletin*, 1959, v. 34, 491]. The filtrates were purified by dialysis against running tap water (to preserve the ability to haemolyse rabbit erythrocytes) followed by column chromatography with carboxymethylcellulose as the adsorbent. Elution was by phosphate buffer *p*H 6·0 (0·0156M). At this stage the isolated alpha toxin fraction haemolysed rabbit and sheep erythrocytes, induced a dermonecrotic reaction in rabbit skin, possessed proteolytic activity on casein and was lethal after intraperitoneal injection into mice. Further purification by zone electrophoresis at different *p*H values brought about an apparent loss of the ability to haemolyse sheep erythrocytes. An interesting and possibly important finding was that the haemolytic and proteolytic properties of the alpha toxin could not be separated by various techniques. This finding was supported by an examination of the culture filtrates of two other strains.

VI. In the previous section (part V above) the chromatographic separation of the culture filtrate of *Staphylococcus aureus* L 16 revealed several distinct protein fractions. Two of these were dermonecrotic, and one of the two was haemolytic. The non-haemolytic dermonecrotic fraction was further shown to be proteolytic towards casein. This proteolytic activity could be separated from the dermonecrotic agent by zone electrophoresis in starch gel at *p*H, 5·0. Both the proteolytic and non-haemolytic dermonecrotic fractions appeared to be protein. Investigations on other virulent strains of *Staph. aureus* revealed that the non-haemolytic dermonecrotic toxin was not consistently produced suggesting this toxin has no major role in the pathogenicity o organism. [For previous parts see *ibid.*, 1956, v. 31, *H. Good*

KATO, Y & OMORI, G. **Extraction of Bound Coagu from Staphylococcal Cells.** *Biken's J.* Os 1959, Dec., v. 2, No. 4, 321–32.

"With the use of bound coagulase positive and coagulase negative *Staphylococci*, attempts were mad extract bound coagulase by the two methods of grin extraction and phenol extraction. As a result, the fol ing properties of the extracts were clarified. With the ground extract and phenol extract, properties sidered to be specific to bound coagulase were seen, as its ability to absorb agglutinin, the clumping inhib antibody in immune sera and fibrinogen adsor activity. The fibrinogen adsorbing substance obta from the ground extract was non-dialyzable, while adsorbing substance obtained by phenol extraction dialyzable. While the former could be observed in ground extracts from bound coagulase negative cells trypsin treated bound coagulase positive cells, the l could be seen only in bound coagulase positive From this, normal cells have been proved to contain different fibrinogen adsorbing substances. The ph extract was divided into two fractions by acetone tionation. The precipitated fraction was non-dialyz antigenic, and could absorb clumping inhibiting antil in antiserum. The supernatant fraction, adsorbed fib gen and was dialyzable. Thus, these two substances different entities."

WELSCH, M. Le "lysozyme" des staphylococ **[Lysozyme of Staphylococcci.]** *C.R. Soc. Biol.* 1 v. 153, No. 12, 2080–83, 5 figs. [Refs. in footnc

30 strains of staphylococci were grown in var media, with agitation, at 30°C. The culture fluids then tested for their ability to lyse a suspension *Micrococcus lysodeikticus.* All strains proved to active, the most suitable culture medium being brain heart infusion broth. The lysin from one strain was able to lyse *Bacillus megaterium*, and to pro protoplasts. *R. E. O. Willia*

SMITH, H. W. &. CRABB, W. E. **The Effect of D containing Tetracyclines and Penicillin on** *Staphylococcus aureus* **Flora of the Nose and S of Pigs and Chickens and their Human At dants.** *J. Path & Bact.* 1960, Apr., v. 79, No 243–9.

Swabs were taken from the skin and nose of 320 200 chickens and 122 men in attendance on the anir which came from a number of different farms. 64% the 160 pigs that had had tetracycline-containing f yielded only tetracycline-resistant staphylococci and yielded resistant and sensitive strains, compared wi

d 3% of 160 pigs not fed with antibiotics. All the ains were penicillin sensitive. 28% of the tetracycline- l and 43% of the control pigs yielded no *Staph. aureus*. Of 100 chickens fed chlortetracycline and penicillin, % yielded strains resistant only to penicillin, 9% ains resistant only to tetracycline and 20% strains istant to both. For 100 control chickens the percen- es were 3, 3, and 1. 5% of the former and 42% of latter group of chickens yielded no *Staph. aureus*. Of 37 men looking after pigs not fed antibodies, none lded a tetracycline-resistant staphylococcus and 5% ve a penicillin-resistant strain from nose or skin or th. Of 35 men looking after tetracycline-fed pigs, 34% lded tetracycline-resistant, and 3% yielded penicillin- d tetracycline-resistant strains. For 50 men looking er penicillin- and tetracycline-fed chickens the percen- es were 14 and 4.

Phage typing showed that, in general, the attendants ried similar staphylococci to their animals.

R. E. O. Williams

UER, A. W., PERRY, D. M. & KIRBY, W. M. M. **Drug Usage and Antibiotic Susceptibility of Staphylococci.** *J. Amer. Med. Ass.* 1960, June 4, v. 173, No. 5, 475–80, 1 graph. [12 refs.]

This paper records changes in the frequency of resis- ce to antibiotics in staphylococci isolated from pati- s at the King County Hospital, Seattle, during 1955– The single disk method was used for estimating sitivity. In strains from in-patients the frequency of istance to penicillin remained steady at about 80% oughout the 5-year period, and that to streptomycin 50–60%. Resistance to tetracycline fell from 67 to %, this fall corresponding to a diminished consump- n of this antibiotic. On the other hand, resistance to thromycin rose from 14 to 31% and the consumption this antibiotic increased. Resistance to chloramphenicol remained steady at 22–27% despite heavy consumption: the authors believe that resistance to this antibiotic less readily induced than to others. Findings in outtients are also reported: in the strains from them istance was generally lower, the difference being least penicillin and greatest for chloramphenicol.

L. P. Garrod

LLINGER, Nell F., LINDBERG, Lois H., RUSSELL, E. L., SIZER, Harriet B., COLE, R. M., BROWNE, A. S. & UPDYKE, Elaine L. **Transport of Streptococci on Filter Paper Strips.** *Pub. Health Rep.* Wash. 1960, Mar., v. 75, No. 3, 251–9, 2 figs. [14 refs.]

The filter paper strip method was tested for the tranort of material from throat swabs for the isolation of haemolytic streptococci. Simultaneously taken paired roat swabs were obtained from 400 patients. One (con-l) was plated immediately in one of three laboratories to blood agar plates and examined for β-haemolytic eptococci after 24 hours' incubation. The second ab was streaked heavily on to a filter paper strip for sting to a laboratory. The filter paper kits consist sterile strips of filter paper wrapped in heavy waxed paper, the whole being contained in a sealed plastic envelope on the back of which are instructions for use [HOLLINGER and LINDBERG, this *Bulletin*, 1959, v. 34, 167].

Inoculated strips were allowed to dry for 3–5 minutes, the kit was refolded, placed in its plastic envelope and sent to one of several laboratories. Control and filter paper cultures were therefore examined in different laboratories. After various lengths of time up to 21 days strips were removed and placed, inoculation side down, on blood agar plates, care being taken to ensure thorough wetting. After 6 hours' incubation at 37°C. the strips were removed and placed on a second blood agar plate. Both plates were examined after 18 hours' incubation. Growth was always heavier on the second plate.

Of 206 group A strains recovered, 52% were from controls and 48% from filter paper strips. Recovery appeared to be as good whether the strips were plated after 2 or 10 days, although numbers plated each day were small.

Owing to differences in technique the results of recovery of groups B, C or G could not be assessed, but the authors conclude that for group A streptococci this is a satisfactory method for transport of throat swab material provided the instructions are carried out.

M. Patricia Jevons

SCHWAB, J. H.; SHARPLESS, E. A. **An Intracellular Hemolysin of Group A Streptococci. III. Immunological Studies** [SCHWAB]. *J. Bacteriology.* 1960, Apr., v. 79, No. 4, 488–95, 1 fig. [16 refs.] **IV. Lethal Activity in Mice** [SHARPLESS & SCHWAB]. *Ibid.*, 496–501, 1 fig. [20 refs.]

III. An extract obtained from a sonically disrupted group A *Streptococcus pyogenes*, type I, possessed haemolytic activity for rabbit cells. This intracellular haemolysin is believed to be a distinct streptococcal product unrelated to streptolysin O and streptolysin S' [this *Bulletin*, 1956, v. 31, 864]. Serum from rabbits immunized with such an active haemolytic extract was shown to contain an antibody which inhibited the effect of intracellular haemolysin. In order to demonstrate the maximum inhibition it was necessary to hold the serum-haemolysin mixture at 3°C. for 24 hours and then centrifuge at 1600 G for 30 minutes. A reduced content of haemolysin was found in the supernatant and no haemolytic activity was present in the material deposited by centrifugation. Neutralization of the haemolysin was also obtained with the gamma globulin fraction of the immune serum but only after the prolonged interaction and centrifugation. 60 human sera were tested for the ability to inhibit streptolysin S' and intracellular haemolysin. With 2 exceptions the inhibition titres of each serum were comparable for both haemolysins and the titres obtained fell in the same range as those found with hyperimmune rabbit serum. 2 serum samples were available from each of the 2 patients with exceptionally high titres. Adsorption, with streptolysin S' and intracellular haemolysin, of these sera supported the evidence that intracellular haemolysin is distinct from steptolysin S'.

IV. Extracts obtained from sonically disrupted group A streptococcal cells are lethal for mice after intravenous injection. Experimental data presented suggest that the lethal activity of these extracts is related to the amount of intracellular haemolysin therein [see part III above]. The haemolytic and lethal factors were affected in a parallel maner by heat, lyophilization, ultracentrifugation and prolonged sonic vibration. [For parts I and II, see *ibid.*, 1956, v. 31, 864 *bis.*] *H. Gooder*

CUSTOD, J. T., LYTLE, R. I., JOHNSON, B. H. & FRANK, P. F. **Interdependence of Hyaluronic Acid and M Protein in Streptococcal Aerosol Infections in Mice.** *Proc. Soc. Exper. Biol. & Med.* 1960, Apr., v. 103, No. 4, 751–3.

The ability of Group A streptococci to induce infection in mice by the aerosol route was studied and related to the ability of the strain to produce hyaluronic acid (HA) and M protein. 12 typable strains of varying colonial morphology and 4 non-typable strains were studied and infectivity was judged by the ability to recover the infecting strain from cervical lymph nodes.

None of the 4 non-typable strains were capable of infecting mice although all produced appreciable amounts of HA. Of the typable strains (producing M antigen) only those producing HA were infective, and there was a linear relationship between the amount of HA produced and infectivity of the strain.

It is suggested that HA is important in the establishment of infection by the aerosol route [this *Bulletin*, 1959, v. 34, 493] in contrast to the minor role it plays in the establishment of infection by the peritoneal route [*ibid.*, 1949, v. 24, 163]. M protein is, however, responsible for the outcome of the infection in both cases.

M. Patricia Jevons

ELLIOTT, S. D. **Type and Group Polysaccharides of Group D Streptococci.** *J. Exper. Med.* 1960, May 1, v. 111, No. 5, 621–30. [23 refs.]

Extracts prepared from cell walls of 4 strains of Group D streptococci belonging to different serological types showed type-specificity. The type-specific material was found to contain a large amount of rhamnose and smaller amounts of glucosamine, muramic acid and glucose; it thus resembled the cell-wall, group-specific polysaccharide of group A streptococci. A group-specific extract could be prepared by repeated alkaline extraction of the cells or by disintegration of the cells remaining after the alkali extraction. The group substance contained very little rhamnose or glucosamine but much glucose; it appeared to be a dextran-like polysaccharide, which may, in the streptococcus, be associated with some bacterial protein. *R. E. O. Williams*

ROSENBERGER, R. F. & ELSDEN, S. R. **The Yields of *Streptococcus faecalis* grown in Continuous Culture.** *J. General Microbiol.* 1960, June, v. 2, No. 3, 726–39, 10 figs. [20 refs.]

ODAKA, T. & WATANABE, T. **Transformation Rea of Pneumococci in the Absence of Serum and Effect of Fatty Acids.** *Japanese J. Exper.* 1959, Oct., v. 29, No. 5, 407–16. [15 refs.]

A rough streptomycin-sensitive strain of pneumoc R36 NC, derived from the strain IID 39S, was he inoculated onto 5% bovine blood meat infusion containing 150 μgm. of dihydrostreptomycin sul per ml. The streptomycin-resistant mutants v developed were inoculated, after reculturing, into va types of casein digest media, and purified preparatio DNA made from the cells. The DNA from the str mycin-resistant cells could confer antibiotic resistan streptomycin-sensitive pneumococci and this happ surprisingly in the absence of serum. Experiments oleic, myristic and stearic acids showed that transfo tion could occur in low concentrations of acid, bu in high concentrations. The suggestion that trac fatty acids (from glassware, plugs, etc.) would in transformation is not justified. *Elizabeth M. Har*

JEBB, W. H. H. & TOMLINSON, A. H. **A Microcul Technique for Observing the Early Growt Mycobacteria.** *J. General Microbiol.* 1960, v. 22, No. 1, 93–101, 4 figs. [16 refs.]

In this method tubercle bacilli are grown in a pep medium as single bacterial units, by the method of W [this *Bulletin*, 1947, v. 22, 137], and then suspende 1% molten agar at 46°C. Loops with an internal meter of $\frac{3}{8}$ inch and made from stainless steel su wire, are dipped into the agar suspension, and afte moval, the agar film within the loop is allowed t before the loop is immersed in the growth medium. incubation the loop is pressed against a slide, the being carefully detached by means of a needle, an slide then flooded with alcohol and left to dry. After ing the film is stained by immersion in carbol fuchs 45°C. for 1 hour, decolourized with 5% sulphuric for 30 minutes and counterstained lightly with meth blue.

Unless serum was present in the medium some ba of agar were toxic but they could be detoxicate extraction with methanol. An assessment of repro bility of the method showed that the number of b developing in the micro-colonies could be estimated the number reached 10.

In Dubos basal medium, growth of H37Rv started before 3 days and occasionally it took 15 but when 0·5% bovine albumin was added the lag p was reduced to 24 hours; the addition to the mediu serum, egg yolk or albumin, lysed red cells, starc charcoal, but not mycobactin, also reduced the lag p to this extent. The generation time of H37Rv in the medium was 23 hours but it was only 14·9 hours serum or egg yolk was added to the medium or whe bacilli were growing in the complete Dubos mediu in Kirchner medium.

Estimations of the lag phase and the generation of freshly isolated strains of tubercle bacilli growi Dubos basal medium +10% horse serum were sho range from 15 to 17 hours and from 13 to 18 h respectively. *S. R. M. Bush*

TTERSON, D. S. P. **The Effect of Trace Metals on the Growth and Metabolism of** *Mycobacterium tuberculosis avium*. *Tubercle*. 1960, June, v. 41, No. 3, 191–202. [17 refs.]

DREJEW, A., GERNEZ-RIEUX, C. & TACQUET, A. Activité lipasique des bacilles tuberculeux et des mycobactéries atypiques. [**Lipase Activity of the Tubercle Bacilli and Atypical Mycobacteria**] *Ann. Inst. Pasteur*. 1960, July, v. 99, No. 1, 56–68, 3 figs. [21 refs.]

CHAN, I. & RAFFEL, S. **A Property of Immune Sera Inhibitory for the Growth of the Tubercle Bacillus.** *J. Immunology*. 1960, Apr., v. 84, No. 4, 374–83, 2 figs. [29 refs.]

Experiments with the serum of guineapigs infected th tubercle bacilli or vaccinated with BCG showed at when the serum was diluted 1 part to 2 parts Hanks t solution it inhibited the growth of H37Rv. The gree of inhibition, shown by viable counts, stained ms and nitrogen determinations, was very marked for ereas the bacilli in the control serum increased 00–10,000 times during the incubation time of 14 days, e increase in the test sera was 0–17 times. The inhibiy factor was shown to be present in the infected ineapigs throughout the 24-week observation period t for only about 3 months in the vaccinated animals.

The activity in the serum was destroyed by heating to °C. but as the activity was still present after heating 56°C. for 1 hour complement is not essential. Calcium ns are essential and therefore no inhibition of growth curs if the serum is diluted with a medium containing dium citrate, *e.g.* Dubos medium. The active comnent migrates electrophoretically with the alpha-globulins and its formation is not inhibited by total body adiation with 400 r; it is not removed by adsorption th tubercle bacilli. Although the serum from guineags that have recovered from a heavy infection by *aphylococcus aureus* also inhibits the growth of the bercle bacillus, the factor present in the tuberculous rum is apparently specifically active against mycobacria for it did not inhibit the growth of bacteria of 9 n-mycobacterial species.

The authors suggest that the factor may be an acutease substance, similar to the C-reactive protein and its ssible significance to acquired immunity against the bercle bacillus is being investigated.

S. R. M. Bushby

TTERSON, D. S. P. **The Lipids of Weybridge PPD.** *Tubercle*. 1960, June, v. 41, No. 3, 186–90.

RUNARAYANAN, M. O., BILLAUDELLE, H. & WARFVINGE, L. E. **The Probable Identity of a Tuberculin Substance with Hydroperoxidase.** *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1960, July, v. 120, No. 1, 22–31, 4 figs. [12 refs.]

BJERKDAL, T. **Degree of Tuberculin Sensitivity in Guinea Pigs Infected with Different Doses of Virulent Tubercle Bacilli.** *Amer. J. Hyg.* 1960, May, v. 71, No. 3, 299–313, 10 figs. [21 refs.]

5 groups, each of 72 healthy guineapigs, were inoculated with different numbers of tubercle bacilli and a 6th with saline as a control group. The infecting organism was H37Rv in suspension of 3,700,000 to 130 viable units per 0·5 ml. (the challenge dose). Each dose was one-thirteenth of the next higher dose.

All animals were tested with 250 TU of PPD before entry to the experiment and only non-reactors were admitted. Beginning with the 4th week after intraperitoneal inoculation tuberculin tests were done every 4–7 weeks with 25 TU.

During the study period not more than 5% of the control animals were found to be reactors at any one time. There was no indication that the frequency of small reactions increased with time or that repeated testing induced tuberculin sensitivity in uninfected animals.

Of the 360 animals challenged with virulent tubercle bacilli 15 (4·2%) failed to become infected; these were in the 2 groups which received the lowest doses.

As the degree of tuberculin sensitivity was seen to decline in the 7 weeks preceding the death of an animal the results of tests within that period were excluded from the analysis.

The mean size of induration in the different groups was examined and statistical tests gave no evidence of a significant difference at any one testing time. There was a basic similarity in frequency distribution at the 4-week test for each dose of bacilli.

There was a decrease in mean size of induration with time after challenge, which is ascribed to animals which survived the longest tending to have smaller reactions than those that died earlier.

It was concluded that in guineapigs the degree of tuberculin sensitivity from a short time after infection is independent of the number of infecting bacilli, that the individual animal retains the same level of sensitivity from soon after infection until the beginning of the terminal stage of tuberculous disease and that higher degrees of resistance to tuberculosis are associated with lower degrees of sensitivity. *H. G. Calwell*

GRUMBACH, Françoise. Chimiothérapie antituberculeuse expérimentale chez le rat blanc. [**Experimental Antituberculosis Chemotherapy in Albino Rats**] *Ann. Inst. Pasteur*. 1960, Apr., v. 98, No. 4, 485–93.

According to BOYER [this *Bulletin*, 1959, v. 34, 150] the sulphones are more effective in the rat than in the mouse against *Klebsiella pneumoniae* infections; the present author has therefore treated rats, infected with the tubercle bacillus, with DDS and its derivative, di-*iso*propylamino-diphenyl-sulphone (3460 CT) to see whether the rat would be a suitable animal for assessing the antituberculous activity of the different sulphones; in the mouse DDS shows little activity. The rats were infected intravenously with H37Rv and after about 65 days they were killed and the effect of treatment assessed by the

extent of the disease in the lungs, and the number of bacilli in sections and cultures from these organs.

From the results the author concluded that the sulphones, given orally, at doses of DDS from 14–70 mgm./kgm. and of 3460 CT from 14–175 mgm./kgm. daily, had no greater activity in the rat than in the mouse and therefore the rat is not suitable for comparing the activities of these drugs. The results with other drugs showed α-ethyl-thio-*iso*nicotinamide to be more active in the rat than in the mouse but streptomycin to be a little less active and isoniazid to be 6 times less active in the rat than in the mouse; the lower activity of isoniazid is presumably due to its being more rapidly inactivated rather than to its being more poorly absorbed.

S. R. M. Bushby

GRUMBACH, F., GROSSET, J. & CANETTI, G. L'inactivation de l'isoniazide chez le rat. Son incidence sur les résultats de la chimiothérapie de la tuberculose dans cette espèce. [**Inactivation of Isoniazid in the Rat. Influence on the Results of Tuberculosis Chemotherapy**] *Ann. Inst. Pasteur.* 1960, May, v. 98, No. 5, 642–56, 1 fig. [26 refs.]

In a previous paper [see above p. 1035] Grumbach reported that isoniazid was less effective in the rat than in the mouse and in the present paper evidence is presented which supports the contention that the lower activity is due to a greater proportion of the drug being acetylated in these animals.

Estimations of the antituberculous activity of the serum of rats after the oral administration of isoniazid showed that after 3·5–4·0 mgm./kgm. doses there was no demonstrable activity but with 7–14 mgm./kgm. doses the activity was equal to 0·5–0·25 μgm. isoniazid per ml. If 200 mgm. PAS or PAB per kgm. were given at the same time, to act competitively for acetylation, the antituberculous activity was increased about 4 times.

In rats infected intravenously with H37Rv, when the effects of treatment were assessed by the extent of the disease and the number of bacilli in the lungs 65 days after infection, daily treatment with 3·5–4·0 mgm. isoniazid per kgm. gave no protection, but if 200 mgm. PAS or PAB were given at the same time, protection equal to that given by 7–8 mgm. isoniazid per kgm. was then afforded. Sensitivity tests on the recovered bacilli showed that resistance did not develop when the number of bacilli present in lungs was very high or very low, but resistance developed in some of the treated animals, including those that received PAS or PAB, that contained an intermediate number of bacilli.

S. R. M. Bushby

AUDRIN, J. Étude de l'activité antituberculeuse de la kanamycine sur 142 souches de bacilles tuberculeux. [**Studies on Antituberculous Activity of Kanamycin on 142 Strains of Tubercle Bacilli**] *Ann. Inst. Pasteur.* 1960, Apr., v. 98, No. 4, 615–17.

Jensen medium was used as the medium but for the first 73 strains the kanamycin in concentrations ranging from 1 to 50 μgm./ml. was allowed to diffuse into medium, and for the other strains it was added be coagulation to give concentrations ranging from 5 t μgm./ml. Large inocula from a primary culture used in the first method, the sensitivities being read 10 days' incubation, but smaller inocula, yielding a 500 colonies were used in the second method the re then being read after 10 and 20 days' incubation.

116 of the strains were from patients who had r been treated with kanamycin and the minimum in tory concentration of the drug for most of these st was less than 10 μgm./ml. but for a few it wa μgm./ml. As some of these strains were hi resistant to streptomycin, PAS or α-ethyl-thio-*iso* tinamide (1314 TH), there was no evidence of resistance between kanamycin and these drugs.

The other 26 strains were isolated from 9 pat undergoing treatment with kanamycin, and alth there was no change in sensitivity in the strains patients during 4 months' treatment, those from the 5 patients became resistant to 50 μgm./ml. aft months' treatment. *S. R. M. Bush*

TSUKAMURA, M. & YAMAMOTO, M. **Genetic Studie the Kanamycin Resistance System of *M bacterium avium*.** *Japanese J. Microbiol.* July, v. 3, No. 3, 247–54. [10 refs.]

See also p. 960, ZOŁACZKOWSKI, KOWALCZYK ŻUKOWSKI, [**Disinfection with Chlorine of Sev Polluted by Tubercle Bacilli. I.**]

CROWLE, A. J. **Tuberculin Skin Reactions in I hypersensitized by Vaccination with Living Av lent Tubercle Bacilli.** *Amer. Rev. Respiratory* 1960, June, v. 81, No. 6, 893–903, 5 figs. [27 r

Mice have usually been regarded as unsuitable for in the experimental study of tuberculosis because of alleged inability to develop tuberculin sensitivity of skin following infection. It has however been show a number of investigators that infected mice do in exhibit the classical type of delayed skin reactio tuberculin [this *Bulletin*, 1957, v. 32, 1102], and ex mental proof of this is given in the present paper.

Mice were inoculated on 2 occasions, with an inte of 1 week, with 0·1 ml. of a water-in-oil emulsion con ing 0·5 mgm. wet weight of the avirulent mycobacte H37Ra. 2 weeks after the 2nd injection the infe mice and uninfected controls were tested intracu ously with 0·01 ml. of 1% tuberculoprotein. Reac were read at 48 hours and induration measured. criterion of a positive reaction was induration of 3 or more.

It was found that mice can be sensitized to tuber reliably by infection as above. Reactor rates of 6 100% were obtained in 5 experiments. The differ between the test mice and the controls was definite consistent, and although central necrosis at the test developed in nearly all animals tested it was less int and persistent in the controls than in the infected r

mmediate reaction to the tuberculin test was seen
) and measured as mm. of diameter of oedema 3
ırs after test. This anaphylactic reaction subsided
ore the delayed reaction of hypersensitivity and
ıld be suppressed by specific desensitization or by
ating the animals with an anti-histamine drug (Pyri-
ızamine) or with cortisone. The delayed tuberculin
ction could be suppressed only by desensitization or
cortisone. It was unaffected by the anti-histamine
ıg.
t is known that delayed hypersensitivity can be trans-
red from vaccinated to normal animals with lym-
oid cells but not with serum and that immediate
ctivity is transferred with serum but not with cells.
owle found as the result of an appropriate experi-
nt that mice receiving thymus cells from tuberculin-
ısitive mice became reactors passively while mice
eiving normal cells or serum from either normal or
persensitive mice did not become reactors. This is
ther evidence that mice develop tuberculin sensitivity
ectable by skin tests. *H. G. Calwell*

ARKS, J. & TROLLOPE, D. R. **A Study of the " Anonymous " Mycobacteria. II. Drug Sensitivity; Pathogenicity; Hypersensitivity.** *Tubercle.* 1960, Apr., v. 41, No. 2, 127–32, 1 fig. **III. Problems of Classification and Diagnosis; Practical Recommendations.** *Ibid.*, 133–42, 2 figs. [10 refs.]

These papers are a continuation of the authors' pre-
ous paper [this *Bulletin,* 1960, v. 35, 696]. In the first
the papers, experiments were described which were
ned at deciding which reactions help in identifying
ese strains of mycobacteria. The second paper exa-
nes their sensitivity and pathogenicity. Because of
ırked variability, the determination of sensitivity to
eptomycin, isoniazid, neomycin and cycloserine was
little value, but as all the strains were resistant to 1
m. PAS per ml., to 40 μgm. pyrazinamide per ml.
d, except for the photochromogens, to 10 μgm. thio-
nicarbazone per ml. the determinations of the sensi-
ities to these antibiotics were of some value.
Most of the photochromogens produced local lesions
en approximately 0·1 mgm. was injected into the
gh muscles of guineapigs, but the typical scotochro-
ogens and the majority of the non-chromogens pro-
ced no lesions. In tests for susceptibility to treatment
th 0·1 N HCl, with and without Triton WR 1339,
ne correlation was found between the tolerance to
s treatment and pathogenicity, especially with the
n-chromogens; with these latter strains some correla-
n was also noted between the probable pathogenicity
man, low catalase activity and slow growth.
20 strains were also tested for ability to produce a
ısitivity reaction in tuberculin-sensitive guineapigs.
e antigens were standardized, autoclaved (5 lb. for
minutes) suspensions of the bacilli, and they produced
ly a slight oedema and erythema.
In the third of the papers the results of the first and
cond papers are considered as a whole and practical
easures for identifying these anonymous mycobacteria
are considered. Although only impracticable experiments would prove that the bacilli are capable of initiating disease in man, the authors maintain that it is reasonable to assume that the bacilli are pathogens when they are repeatedly isolated from man. A high incidence of the casual non-pathogenic strains in a laboratory suggests faulty technique, *e.g.* contamination with water or too mild a method of preparation for culture, since these strains are less resistant to acid treatment.

A provisional classification, based on that of Runyon, is suggested, but the authors prefer to refer to the Type III bacilli as non-chromogens rather than non-photochromogens, a term which might be taken to include scotochromogens. [The characteristics of the 3 types are described.] The avian tubercle bacilli can usually be distinguished from the anonymous strains by their ability to grow well at 44–45°C., from those of Type I by their high resistance to thiosemicarbazone, and from those of Type II by resistance to tetrazolium salts.

In 1957 the authors cultured 32,514 samples of sputum and 5,970 specimens of gastric contents; 6,325 were positive for mycobacteria; anonymous bacilli were isolated from 38 patients. No single test identified all of these anonymous strains. [15 criteria used for identification are listed and the frequency with which they were fulfilled is given; a recommended screening procedure for cultures on egg medium is also outlined.]

The most valuable points in identification are: (1) a lemon, orange or red pigment on Löwenstein-Jensen medium excludes the tubercle bacillus; (2) all anonymous strains, other than photochromogens, grow on the medium containing 10 μgm. thiosemicarbazone per ml., and usually within 4 weeks at 25°C. [This series of papers is a valuable contribution to the study of the strains of mycobacteria, and they should be read in their entirety.] *S. R. M. Bushby*

TAKEYA, K., ZINNAKA, Y., YAMAURA, K. & TODA, T. **Bacteriophage Susceptibility and Tuberculin Specificity of Unclassified Mycobacteria.** *Amer. Rev. Respiratory Dis.* 1960, May, v. 81, No. 5, 674–82. [34 refs.]

These investigations were made on 5 photochromogens, 3 non-chromogens and 1 scotochromogen isolated in the U.S.A. and 5 unclassified mycobacteria isolated in Japan; 9 strains isolated from lymph nodes of dogs were also included.

10 mycobacteriophages were used and of these 5 were lytic for H37Rv, 8 for saprophytic mycobacteria, but none for a strain of *Mycobacterium avium.* None of the phages lysed the human unclassified mycobacteria but 5 of them lysed the 5 dog strains which produced rough colonies and were virulent to guineapigs; the other 4 dog strains were insensitive and they produced smooth colonies and were avirulent to guineapigs.

Comparison of the intensities of cross-tuberculin reactions in guineapigs sensitized by injections of 3 of the photochromogens, 3 of the non-chromogens, the scotochromogen, H37Rv, *Myco. avium,* and *Myco.*

phlei, using as the test antigen samples of PPD from each of the strains, indicated (1) that the PPD of the photochromogens and the non-chromogens are not closely related, and (2) that the photochromogens are more closely related to the human tubercle bacillus and the non-chromogens to the avian tubercle bacillus. This difference between the photochromogens and the non-chromogens was further emphasized by the former strains producing a final *p*H value in the PPD-production-medium of 6·0–7·6 and the latter of 8·2–9·0. No difference was found between the susceptibility to potassium tellurite of these atypical acid-fast bacilli; they were inhibited by 0·05%, as was the avian tubercle bacillus, but the human tubercle bacillus was inhibited by 0·005%, the bovine strains by 0·01%, and the saprophytic strains by 1·0%.

The authors conclude that the non-chromogens are closely related to *Myco. avium.* *S. R. M. Bushby*

Weiss, D. L. & Fusillo, M. H. **Lack of Reactivity to Tuberculous Antigen of Leprosy Sera as assayed by the Globulin Titration Technique.** *Internat. J. Leprosy.* Wash. 1960, Jan.–Mar., v. 28, No. 1, 47–9, 1 fig.

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 1071.]

Bönicke, R. Über das Vorkommen von Acylamidasen in Mycobakterien. IV. Mitteilung: Die Differenzierung schnell wachsender Mykobakterien der Species *Mycobacterium smegmatis, Mycobacterium phlei, Mycobacterium fortuitum* und *Mycobacterium thamnopheos* durch Nachweis ihrer unterschiedlichen acylamidatischen Stoffwechselleistungen. [**Occurrence of Acylamidase in Mycobacteria. IV: Differentiation of Quickly Growing Mycobacteria of the Species** *Myco. smegmatis, Myco. phlei, Myco. fortuitum* **and** *Myco. thamnopheos* **by Demonstration of their Different Acylamide Metabolic Patterns**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 179, No. 2, 209–23. [10 refs.] V. Mitteilung: Die Identifizierung von "atypischen" Mycobakterien der photochromogenen Gruppe mit Hilfe der "Amid-Reihe". [**V.: Identification of "Atypical" Mycobacteria of the Photochromogenic Group with Different Amide Compounds**] *Ibid.,* 223–30, 5 coloured figs. on pl.

Murata, R., Akama, K., Hirose, S., Kameyama, S., Nakano T. & Yamamoto, A. **Virulence and Immunity of** *Corynebacterium diphtheriae.* **I. General Pictures of Infection and Immunity in the Conjunctival Diphtheria.** *Japanese J. Med. Sci. & Biol.* 1959, Oct., v. 12, No. 5, 319–30. [22 refs.]

The lesions produced when a number of different strains of *Corynebacterium diphtheriae* are inoculated in the eye of the guineapig after trauma by heat are described. 2 *mitis* strains, PW8 and another, were used, also 2 *intermedius* strains isolated from carriers a *gravis* strains, 2 from carriers, 3 from patients 2 obtained from another centre. The lesions v from clouding of cornea with swelling of eyeli purulent discharge, ulceration, necrosis and death.

The lesions with the *mitis* strains were trivial an relationship of capacity for *in vitro* toxin produ and virulence by this test could be determined. most severe results were obtained with 2 of the *g* strains and with the 2 *intermedius* strains tested. lence as assessed by this test was apparently a char of the individual strain rather than of any grou strains distinguished by appearance in culture immunological grouping.

There was very little evidence of immunity ar directly from these infections, but the surviving ani showed a latent immunity in the rate and degre their response to toxoid injection. *J. W. McLe*

Ciucă, M. *et al.* Rôle des bactériophages dans l'écol microbienne. Note I. Le complexe écologique microflore dans le rhino-pharynx des malades, rapport à l'évolution et aux particularités clini de l'angine diphtérique. [**The Part played Bacteriophages in Microbial Ecology. I. R tionships between the Clinical Forms of D theritic Angina and the Ecological Comple the Microflora in the Rhinopharynx of Patients**] *Arch. Roumaines Path. Expér. et Mi biol.* 1959, Dec., v. 18, No. 4, 493–507. [21 r Note II. Transduction de la lysogénie-ho hétérologue diphtèro-staphylococcique, dans conditions écologiques naturelles de l'angine d térique. [**2. The Transduction of Homo-Het logous Diphthero-Staphylococcic Lysogeni under the Natural Ecological Circumstance Diphtheritic Angina**] *Ibid.,* 509–18, 6 figs.

I. An elaborate investigation of a small grou diphtheria infections carried through by a large t of investigators is described. The general objective to determine how far the various factors operatin the site of infection were responsible for the cours the disease. To this end account was taken of su or failure in detecting diphtheria bacilli, the mor logical and biochemical characters of the st isolated, the administration of serum and antibi the amount of toxin produced, the sensitivity to and capacity for lysogenesis of the strains isolated presence of free diphtheria bacteriophage in the r pharyngeal washings, the associated bacteria, susceptibility to bacteriophage lysis and lysog qualities. These last observations were especially prehensive for the staphylococci present.

18 cases are described of diphtheria-like angina from thirteen of these *Corynebacterium diphtheriae* isolated, including 5 *intermedius,* 4 *gravis,* 3 *mitis* i tions and one of type undetermined. There were which the *C. diphtheriae* was not isolated, in 3 of t diagnosis was by the recognition of free diphth bacteriophage in the secretions of the naso-pharynx in 2 by the late development of paralysis.

A great number of interesting observations are pre-ted which do not permit of any brief summary or arly-defined conclusions. Among the suggestions de are that phage derived from enterococcus as well the staphylococcus may in ecological association vert non-toxigenic diphtheria strains to lyso-stant, lysogenic and toxin-producing forms and that modification of the *C. diphtheriae* is more impor-t in determining the severity of the disease produced n the "morpho-biochemical" type of the micro-anisms (*gravis, intermedius* or *mitis*).

t is also suggested that the demonstration of free htheria phage in the absence of the bacilli may ve valuable in diagnosis and in epidemiological ervations.

I. This paper describes in detail the evolution of of these cases in which extensive observations were de on the first and ninth days of illness and on the ty-first day in convalescence.

A *gravis* strain, non-lysogenic and lyso-resistant, and o free diphtheria phage were observed in the first cimen. These were associated with a pathogenic phylococcus which was non-lysogenic and showed phage sensitivity pattern 6/7/47/53/54/70/73/77/ E/75. In the second specimen the *C. diphtheriae* d disappeared although free diphtheria phage per-ed and the staphylococcus isolated had become ogenic with diminished phage sensitivity 53/75/77, in the same bacteriophage group. At the last isola-n diphtheria bacilli and free diphtheria phage were h absent but a pathogenic staphylococcus lysogenic d lysoresistant was isolated and free staphylococcus age active for strains 6/7/42E/47/53/75/77 was ected.

An *in vitro* transformation of the staphylococcal ain first isolated was effected with some difficulty h the free diphtheria phage present in the patient's retions at the outset. This is adduced in support of conclusion that a "transduction" of non-lysogenic phylococcus had been effected *in vivo* under the uence of free diphtheria phage. *J. W. McLeod*

NAI, Y. [**Immunological Studies on Histamine Sensitizing Factor in Bordetella Pertussis. Part I. The General Features of Histamine Sensitizing Factor (HSF)**] *J. Osaka City Med. Center.* 1959, Nov., v. 8, No. 11, 1703–8. [30 refs.] [**Part II. Toxoiding of Histamine Sensitizing Factor (HSF) with Formalin**] *Ibid.*, 1709–14. [16 refs.] [In Japanese.]

The English summaries appended to the papers are as lows:—

. "The general features of HSF of Bordetella per-sis are studied with the following results:

1) 33 strain which is a variant of Phase I Bordetella tussis possesses HSF.

2) The HSF potency varies according to individual ains. HSF varies also in its localization; it is existent stly in the cell for ♯33 strain, and in the culture ernate for ♯18–323.

"3) The histamine susceptibility is most accelerated in mice on the fifth day after inoculation of ♯33 strain. It shows a gradual decrease afterwards.

"4) HSF is considered an unstable substance both for dilution and freezing-and-thawing.

"5) HSF of ♯33 strain behaves to heat as HSF of Phase I Bordetella pertussis. It shows few changes at 56°C. for 30 minutes, but shows no activities at 80°C. for 30 minutes.

"6) HSF is nondialyzable, but it loses its activities after being filtered.

"7) HSF of ♯33 strain shows antigenicity in rabbits; it is found to be serologically identical with HSF of Phase I Bordetella pertussis."

II. "The effects of formalin on HSF of Bordetella pertussis vaccine and culture supernate are studied with the following results:

"1) When Bordetella pertussis suspension and its culture supernate are added with formalin at a rate of 0·5% (v/v) and kept at 37°C., the HSF contained loses its activities but maintains its antigenicity. The HSF-toxoid inoculated into mice results in the development of immunity against HSF.

"2) Inoculation of the aforesaid formalized antigen to rabbits results in the production of antibody which neutralizes HSF.

"3) Heating of HSF at 80°C. for 30 minutes results in a loss of its activities and antigenicity.

"4) It is supported to conclude that HSF may be regarded as an exotoxin."

GORRILL, R. H. & MCNEIL, Evelyn M. **The Effect of Cold Diluent on the Viable Count of** *Pseudomonas pyocyanea. J. General Microbiol.* 1960, Apr., v. 22, No. 2, 437–42, 6 figs.

In making viable counts of bacteria by the routine procedures which involve dilution of the original culture the effect of the temperature of the diluent may be an important consideration. Young actively dividing cultures of some organisms are very susceptible to low temperatures while others are resistant to cold shock.

It was found that heavy dilution of young cultures of *Pseudomonas pyocyanea* with ice-cold distilled water, even when the counting was done immediately afterwards, resulted in more than 90% of the organisms being killed. Buffered diluents at the same temperatures did not have this immediate effect and staphylococci withstood dilution with distilled water at 0°C. without detectable lowering of the subsequent viable counts. In general the simpler the composition of the diluent the more lethal its effect at 0°C.; distilled water was the most active. Temperatures between 37° and 18°C. were without effect; at 4° and particularly at 10°C., so long as the cooling was rapidly brought about by heavy dilution, the effect was very marked. Old cultures were much less sensitive. Other Gram-negative bacilli, *Salmonella typhi-murium* and *Escherichia coli,* were found to be sensitive, under the same conditions, to cold shock though less so than *Ps. pyocyanea,* whereas *Staphylococcus aureus,* as indicated above, showed a marked resistance to its effect. *H. J. Bensted*

KLINGE, K. Die Bedeutung der Oxydase-Reaktion für die Identifizierung von Pseudomonas aeruginosa, Pseudomonas fluorescens und Pseudomonas putida. [**Importance of the Oxidase Reaction for the Identification of** *Pseudomonas pyocyanea, P. fluorescens* **and** *P. putida.*] *Arch. f. Hyg. u. Bakt.* 1960, June, v. 144, No. 4, 263–76. [20 refs.]

The English summary appended to the paper is as follows:—

"Strains belonging to the species Pseudomonas aeruginosa, Pseudomonas fluorescens and Pseudomonas putida gave a positive cytochrome oxidase test (nadi reaction). The conditions required for the performance of the test with respect to the amount of bacterial growth, nutrient media, *p*H and reagents were described. The morphological and biochemical characteristics necessary for the classification of bacterial strains as Pseudomonas aeruginosa, Pseudomonas fluorescens and Pseudomonas putida were summarized. The cytochrome oxidase test is a valuable means for the identification and detection of those strains in mixed cultures."

UNITED STATES DEPT. HEALTH, EDUCATION & WELFARE. **Enterobacteriaceae. Biochemical Methods for Group Differentiation** [EWING, W. H.]. *Pub. Health Service Publication No. 734.* 1960. 30 pp. [33 refs.] Wash. 25, D.C.: Superintendent of Documents, U.S. Govt. Printing Office. [$0.20.]

This monograph from the Communicable Diseases Center, Atlanta, is a compilation of formulae and methods recommended for those working with enteric bacteria. It is divided into two parts; tests considered essential for the determination of the group to which an enteric organism belongs [the notation of a group is used in place of the more familiar genus] and additional tests of value in group or sub-group determination.

Tests included as essential are indole formation, Methyl Red (MR) and Voges-Proskauer (VP), citrate utilization, H_2S production, urease activity, growth in potassium cyanide (KCN) media, motility, gelatin liquefaction, decarboxylase activity, ninhydrin test, phenylalanine deamination and carbohydrate fermentations. Many of the methods have been recommended by the international Subcommittee on Enterobacteriaceae [this *Bulletin,* 1958, v. 33, 507] but the value of this monograph lies in the notes and comments on the various tests.

[As taxonomy is subjective, each worker will have his own idea of which tests are essential. The abstracter would include a test for the utilization of malonate and delete the ninhydrin test from the essential ones. The reagent recommended for the VP reaction is an alkaline solution of creatine; such solutions are however unstable on storage and it is better to keep creatine as a solution in dilute acid. Mention is not made of false positive reactions in the arginine decarboxylase test, due to the presence of aginine dihydrolase; in the absence of urease, these can be detected by testing for ammonia. The glutamic acid decarboxylase test is fraught with technical difficulties and is wisely omitted. Dr. E has noted that the results of decarboxylase ac obtained by FALKOW'S method [this *Bulletin,* 1959, 564] and MØLLER'S [*Acta Path. et Microb. Scandinc* 1955, v. 36, 158] do not always agree and regards latter as the standard reference method in taxon A method for the enhancement of pigment produ by *Pseudomonas* cultures seems out of place in a m graph dealing with the Enterobacteriaceae. Pse monads can usually be distinguished by mean HUGH and LEIFSON'S [this *Bulletin,* 1954, v. 29, oxidation-fermentation medium or other simple test *K. J. St*

SCHÄFLER, S., MINTZER, Leonie & SCHÄFLER, Cătă **Acquisition of Lactose Fermenting Propertie Salmonellae. II. Role of the Medium.** *J. teriology.* 1960, Feb., v. 79, No. 2, 203–12, 4 [15 refs.]

All lactose-positive variants obtained by prolo incubation of salmonellae in the presence of lactose found to be cellobiose-positive and, in turn, the c biose variants far more readily yielded lactose-pos variants than the initial salmonella strains [see *Bulletin,* 1960, v. 35, 188]. These lactose-pos variants derived from cellobiose-positive variants c be partially or wholly suppressed by succinate, g mate, cellobiose, peptone, nutrient broth and Hottin broth (a hydrolysate of beef meat, liver, pancreas duodenal mucosa with other ingredients). Lac positive variants obtained by selection from organ under long cultivation in a lactose medium ferme lactose at a faster rate than the other type of varian that the inhibition or suppression of lactose utiliz by the substances named above was less pronounce

The competition between the fermentation of la and the utilization of other substances from the cu medium, together with the relatively poor growt lactose-positive variants under conditions where are unable to utilize lactose, probably account, in bination with other factors, for the infreq appearance of lactose-positive variants in the u laboratory media. *H. J. Benst*

SCHRIRE, L. **The a-z-z_{35} Group of** *Salmonella* **Antig** [Correspondence.] *Nature.* 1960, May 14, v. 569–70, 1 fig.

[It has always been recognized that most of salmonella organisms have a more complex antig structure than that displayed in the Kauffmann-W Schema; only the major antigens or those of differe importance are recorded. Both O and H antigens be much more complex than the formula would sug Moreover, a single antigen, as designated by an ap priate symbol, is not always identical, throughout group, with similarly designated antigens. The com symbol indicates a relationship, but this is often pa and is only due to one common fraction, with sepa specific fractions which can only be revealed by fully performed agglutinin absorption techniques. T

many examples of this in the literature. In this nexion O-antigen 1 has recently been investigated by CKER *et al.* (see below).]

The present paper concerns the flagella antigen *z*, as occurs in a new salmonella organism, Salmonella enside, in the H antigen-complex, *a z* z_{35}. This tion *z* is related to the fraction *z* in Salm. Poona, it is not identical with it. Similarly fractions *a* and are related to the *a* of *Salm. paratyphi A* and the of Salm. Chittagong respectively but are not iden- l with them. All salmonella organisms carrying or *z* had been examined by agglutinin absorption cedures and it was found that *z* occurred in two ns, z_b and z_p, both being related through a common tion, but each possessed a specific fraction. The *z* Salm. Poona is present in the form z_p, whereas the *z* Salm. Greenside is present in the form z_b. Factor lso consists of a number of sub-fractions related ough a common fraction and it would seem that z_{35} related to antigen *a* through a special fraction a_1 re are 3 other fractions in antigen *a*).

H. J. Bensted

CKER, B. A. D., STAUB, A. M., TINELLI, R. & KOPACKA, B. Étude immunochimique sur les *Salmonella*. VI. Étude de l'antigène 1 présent sur deux *Salmonella* des groupes B et E_4. [**Immunochemical Studies on *Salmonella*. VI. Study of Antigen 1 present in Two *Salmonella* belonging to the B and E_4 Groups**] *Ann. Inst. Pasteur.* 1960, Apr., v. 98, No. 4, 505–23, 1 text fig. & 2 figs. on pl. [30 refs.]

The Kauffmann-White Schema displays the antigenic mula of every recognized member of the *Salmonella* up. In accordance with the O-determining antigen antigen-complex, the various members are allotted r place in one of the alphabetically designated ups. Where necessary, because of common deter- ining factors, there are sub-groups designated by a -index numeral. The schema has never pretended to r the complete antigenic constitution of the ignated serotypes, and it has long been known that lisclosed minor antigenic fractions may appear to e better representation in some strains than in ers. In addition, the fact that two different serotypes shown as possessing an antigenic fraction with the ne designation does not necessarily mean that these antigenic fractions are identical. Quantitative ss-absorption procedures will often disclose a partial ationship only. Although little has been published ut these related, but non-identical, antigen com- nents which have been given the same identifying nbol, their existence and the complicating issues ing from them are well recognized by some workers. The authors of the present paper are concerned with antigen 1 which may be present in salmonella anisms belonging to O groups A, B, D and E_4. Sero- ical procedures clearly show that antigen 1 in group (1,3,19) is not identical with antigen 1 in groups A, and D (1,2,12; 1,4,12 and 1,9,12). The two strains died here are *Salm. typhi-murium* (group B) and m. Senftenberg (group E_4). In *Salm. typhi-murium*, the presence of antigen 1 is determined by a lysogeniz- ing phage whereas in Salm. Senftenberg its presence does not seem to be determined by a phage. A com- bination of chemical analyses and specific inhibition techniques applied to the precipitating system, *Salm. typhi-murium* serum with polysaccharide of Salm. Senftenberg, indicates that although the two antigens 1 are different there is a common fraction, the determin- ing groups of which are found in the polysaccharides extracted from the bacterial cells. The suggested structure of this common oligosaccharide is

$$\begin{matrix} & & 1 \longrightarrow 3 & \\ \text{glucose} & \text{or} & & \text{— galactose — mannose} \\ & & 1 \longrightarrow 6 & \end{matrix}$$

The inhibition studies were carried out with simple sugars and with the oligosaccharides present in Salm. Senftenberg (1,3,19) and *Salm. typhi-murium* (1,4,12 (lysogenic)) but absent from the susceptible *Salm. typhi-murium* (4,12). *H. J. Bensted*

LÜDERITZ, O., KAUFFMANN, F., STIERLIN, H. & WESTPHAL, O. Zur Immunchemie der O-Antigene von Enterobacteriaceae. II. Vergleich der Zuckerbausteine von *Salmonella* S-, R- und T-Formen. [**Immunochemistry of the O-Antigens of Enterobacteriaceae. II. Comparison of the Sugar Components of *Salmonella* S, R and T Forms**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 179, No. 2, 180–86. [20 refs.]

BOLAÑOS, R. Frecuencia de *Salmonella* y *Shigella* en moscas domésticas colectadas en la ciudad de San José. [**Incidence of Salmonella and Shigella in Flies caught in the City of San José**] *Rev. Biologia Trop.* San José, Costa Rica. 1959, Dec., v. 7, No. 2, 207–10. English summary (6 lines).

Flies caught from houses near the municipal abattoir over a period of 1 year, from the animal house of the University of Costa Rica, and from the central market over a period of 3 months, were ground up in sterile mortars with saline and the emulsion sown on selective media suitable for the growth of salmonellae and shigellae. The flies were divided into batches of 20 each, 100 batches being examined.

Of the 3,121 flies caught, 97·9% were identified as *Musca domestica*, and out of the 100 batches 24 were positive for salmonellae and 1 for shigellae; of 66 lots from near the municipal abattoir 22 were positive for salmonellae, none for shigellae; of 7 from the University, 2 were salmonella-positive; and of 27 batches from the central market none showed salmonellae, but 1 showed shigellae. No seasonal variation was found in flies caught near the abattoir but from the 22 salmonella-positive batches 26 strains were isolated; 4 were not identified but the remainder were: *Salm. anatum* (5), Salm. Newport (4), Salm. Panama, *Salm. give*, and Salm. St. Paul (3) each, Salm. San Diego (2) and Salm. Reading, and Salm. Zanzibar (1) each. The shigella strain was *Shigella boydii*.

The author considers the incidence of pathogenic

enterobacteria found in this investigation is too high, and mentions that intestinal diseases are the principal cause of infant deaths in Costa Rica.

W. K. Dunscombe

CLEMMER, Dorothy I., HICKEY, J. L. S., BRIDGES, Joan F., SCHLIESSMANN, D. J. & SHAFFER, M. F. **Bacteriologic Studies of Experimental Air-Borne Salmonellosis in Chicks.** *J. Infect. Dis.* 1960, Mar.–Apr., v. 106, No. 2, 197–210. [54 refs.]

New Hampshire Red chicks 1–2 days old were exposed to quantitative aerosols of (a) *Salmonella paratyphi B,* Salm. Heidelberg, Salm. Montevideo, Salm. Muenchen, Salm. Tennessee, *Salm. enteritidis, Salm. meleagridis* and (b) *Salm. pullorum.*

With regard to the organisms (a) the number of retained inhaled bacteria necessary for infection of the chicks was low—in some cases as low as 20 viable cells. The organisms multiplied in the lungs over a period of several days but the pulmonary infection was self-limiting. Nevertheless it might take 2–3 weeks to clear up entirely. In only a small proportion of the birds was there any failure of the natural defence mechanism to restrict growth of the bacteria. When this occurred there was massive growth of the salmonellae concerned leading to a fatal outcome. Inoculated by the oral route an enteric infection developed, but this frequently became generalized with lung involvement. Likewise aerosol inoculations often led to generalized infections with involvement of the gut. The average mortality of birds infected by aerosol was no greater than with those infected by the oral route.

On the other hand, chicks exposed to aerosols of (b) *Salmonella pullorum* suffered much more heavily than those exposed to aerosols of other salmonellae. The pulmonary infections were severe and the bird mortality was at least twice that following orally induced infections. Chick lung tissue appears to be very susceptible to infection with *Salm. pullorum* and there is a good deal of evidence to indicate that *pullorum* epidemics are mainly due to cross-infection by air-borne bacteria.

H. J. Bensted

FICHERA, G. Suddivisione biochimica e batteriofagica di stipiti di *S. typhi* lisotipo A. [**Subdivision of Typhoid Strains of the Lytic type A by Biochemical and Bacteriophage Observations**] *Riv. Istituto Sieroterap. Ital.* 1960, Jan.–Feb., v. 35, No. 1, 44–51. [16 refs.] English summary (9 lines).

In the area of Southern Italy and Sicily where endemic typhoid is well established, the utility of the Craigie-Yen lytic type classification in tracing channels of infection is limited by the large number of cases belonging to the A group.

Of the methods recommended for the subdivision of this group that of NICOLLE [this *Bulletin,* 1959, v. 34, 264 *bis*] and his colleagues, which extends the original methods by the introduction of a number of additional phage preparations, has been found most useful. This test identifies the strain predominant in the area with the subtype Tananarive in Nicolle's scheme. The majority of strains isolated were found to fall int type and also to ferment xylose.

[Since so many strains typed as group A woul be brought into the T subtype it is not clear tha brings the author's problem nearer solution.]

J. W. McL

SCHOLTENS, R. T. **Lysogenicity of Atypical Strai *Salmonella paratyphi B* with Observations on D-Tartrate Fermentation.** *Antonie van Lee hoek: J. Microbiol. & Serol.* 1960 v. 26, N 27–32. [19 refs.]

The atypical strains of *Salmonella paratyphi B,* which this article is concerned, are strains isolated cases of gastro-enteritis, or by chance from h persons, but not from patients suffering from t paratyphoid fever. They differed, however, fro Java variety of *Salm. paratyphi B* in that they di ferment D-tartrate in 24 hours. Some of the cu showed fermentation after 2 weeks and in other it was possible to obtain D-tartrate-fermenting va after longer incubation. It is considered that thi of late fermentation of D-tartrate is not a very factory distinguishing character because the autho able, by the same method, to isolate D-tartrate-po variants from true *Salm. paratyphi B* strains. important difference was in the natural phages c by the strains; in addition to phages I and IV the contained an atypical phage VI. This particular was serologically identical with phage VI of *paratyphi B,* but it was almost completely inacti after heating at 56°C. for one hour whereas the t phage VI is hardly affected by such treatment. S of *Salm. paratyphi B* containing natural phages VI in combination have hitherto not been reporte

H. J. Bens

i. HARTMAN, P. E., LOPER, J. C. & ŠERMAN, D. **Structure Mapping by Complete Transdu between Histidine-Requiring Salmonella Mut** *J. General Microbiol.* 1960, Apr., v. 22, N 323–53, 4 figs. [39 refs.]

ii. HARTMAN, P. E., HARTMAN, Z. & ŠERMAN, D. **plementation Mapping by Abortive Transdu of Histidine-Requiring Salmonella Mutants** *General Microbiol.* 1960, Apr., v. 22, No. 2, 68, 3 figs. on pl. & 2 text figs. [22 refs.]

iii. AMES, B. N., GARRY, Barbara & HERZEN Leonore A. **The Genetic Control of the Enz of Histidine Biosynthesis in** *Salmonella murium. J. General Microbiol.* 1960, Apr., No. 2, 369–78. [24 refs.]

These 3 important papers are closely related. original text should be studied because specialized papers of this nature are difficult to marize adequately; it is only feasible here to in the scope of the work described.

he previous work of Hartman (*Genetic Studies with teria, Publications Carnegie Inst.*, 1956, No. 612, 35), study of histidine-requiring mutants of *Salmonella hi-murium*, indicated that at least 4 closely linked es were involved in as many different steps of histi- synthesis, and there was some evidence that the es were linked in an order corresponding to the uence of reactions they controlled in the biosynthetic nway. This order was derived from a comparison genetic mapping, by means of the frequency with ch two histidine-requiring mutants recombine to duce prototrophs, with studies on precursor accumu- ons and growth responses.

The first paper describes the growth characteris- accumulations and genetic tests carried out by ns of complete transduction for over 200 indepen- tly isolated histidine-requiring mutants of *Salm. hi-murium*. The sites of mutation (*site* is a region of e, altered in the mutant, which can recombine with acent sites) engendering the histidine-requiring notype all lie within a short chromosomal region. -divisions of this region, each correlated with a cific physiological phenotype, represent in each case place on the chromosome occupied by a gene in any its forms, wild type or mutant, and is known as the *e locus*. The positioning and function of these gene are discussed, and single-site and multi-site tations described.

. The second paper describes the functional aviour as detected by abortive transduction. In nplete transduction the genetic material is integrated the replicating genome, resulting in true clonal eritance of the transduced trait. In abortive trans- tion, the transduced fragment is not integrated; ner, the transduced genetic material may be pictured existing in a non-replicating form, passing unilinearly m the recipient cell to only one of the daughter cells each cell division. Thus at any given time there is sent only one bacterium in the clone containing the etic fragment [this *Bulletin*, 1957, v. 32, 371]. Some es behave as single functional units, while others are nposed of 2, and some of 4, functional sub-units mplementation units). The existence of mutants h overlapping intragenic non-complementing patterns y allow crude mapping, solely by complementation some mutational sites within certain single genes.

ii. 3 classes of histidine-lacking mutants of *Salmo- la typhi-murium* have been shown to be associated h absence of imidazoleglycerol phosphate dehydro- ase, imidazoleacetol phosphate transaminase, and idinol dehydrogenase, respectively. Certain mutants, ich have been shown to behave as those involving or more adjacent sites of a single gene or of acent genes, lack these enzymes; they also lack a rth enzyme, histidinol phosphate phosphatase, for ich no single-site mutants are available. The value formyl-histidine as a source of histidine for histidine- uiring mutants is discussed.

The authors of this series of papers have thoughtfully vided a form of glossary to explain the meaning of ne of the terms used by them. *H. J. Bensted*

Cameron, J. A., Holtman, D. F. & Jeffries, C. D. **The Association of Virulence with Endotoxin in** *Salmonella pullorum*. *J. Infect. Dis.* 1960, Mar.–Apr., v. 106, No. 2, 159–61.

The virulence of cultures of virulent and avirulent *Salmonella pullorum* in young chicks was compared with the virulence of endotoxins prepared from trichloracetic extracts of cultures of the same strains. The avirulent strain, NEC 17, produced an endotoxin having the same potency as that of the virulent strain CDC 3522/51, but the yield of endotoxin from the avirulent strain on a dry weight basis was significantly less and consequently the virulence was less. When, however, the virulence of endotoxins of strains of intermediate virulence was compared, the results indicated that the differences were not due to yield of toxin being different but to differences in the toxicity of the various endotoxins. *H. J. Bensted*

Hofmann, S., Kauffmann, F. & Anz, W. Eine neue *Salmonella*-Species Salmonella Bornum=6,(7),(14):z_{38}:- und eine neue *Salmonella*-O-Untergruppe (C4). [**A new Salmonella Species:** *Salmonella Bornum* = 6,(7),(14):z_{38}:- **and a new Salmonella O Subgroup (C4)**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 179, No. 1, 39–42.

A report is given of the investigation of a new salmonella serotype (here referred to as species) classified in group C of the Kauffmann-White Scheme, in which known somatic antigens are found grouped together in a manner not hitherto described. The somatic antigens (7) and (14) of the new strain are closely related to but not identical with antigens designated by numbers in other salmonellae. Biochemical reactions are given.

The authors proceed to re-investigate a number of known salmonellae within the 6,7 group, giving a list of those in which antigen (14) is discovered, and suggest that in group C, sub-group 4, should be created to include salmonellae with the somatic structure 6,(7),(14). Tables showing serological investigations are given. [The tables of agglutination and agglutinin absorption tests, on which the argument is based, show the results as + or −, no figures for titration of positive findings being given; so the reader is unable to assess the validity of the argument or to decide whether the antigens are major or so minor that they would have been indicated by dots in earlier editions of the Kauffmann-White Scheme.] *Joan Taylor*

i. Manolov, D. G. **A New Species of Bacterium of the Genus** *Shigella*. *J. Microbiol., Epidemiol. & Immunobiol.* London. 1958, v. 29, No. 12, 1979–82.

ii. ——. **A New Type of the Genus** *Shigella* — **"Shigella 13"**. *J. Hyg., Epidemiol., Microbiol. & Immunol.* Prague. 1959, v. 3, No. 2, 184–90, 7 figs. (6 on pl.) [15 refs.]

These 2 papers appear to be slightly different versions of a communication which may have been presented

elsewhere by Manolov; it is sometimes difficult to trace exact sources in these 2 journals. Whatever the explanation may be for the appearance of the 2 separate papers it is clear that both are concerned with the presentation of what is essentially the same material for consideration. That is, that a non-motile Gram-negative organism that fails to ferment lactose, dulcite or saccharose but which produces acid without gas in glucose, mannite, maltose and rhamnose, alkalinity in milk, utilizes citrate and is indole positive, should be included in the Shigella group. The organism showed some minor antigenic relationship to *Bacterium alkalescens* II, but the author's main claim for its recognition as a member of the Shigella group is based on the fact that it produces a positive kerato-conjunctivitis reaction in guineapigs. Manolov claims that the instillation of a suspension of any shigella organism into the eye of a guineapig produces an acute kerato-conjunctivitis; the reaction is not produced by any other member of the family of Enterobacteriaceae and may be regarded as a specific property of the shigellae [SERENY, this *Bulletin*, 1958, v. 33, 690; Manolov, *ibid.*, 689].

Although this particular organism appears to have biochemical properties which may place it outside the *alkalescens-dispar* group, many variants considered to belong to this group have been described and bacteria having very similar characters have not infrequently been isolated from so-called dysentery patients. There has always been some doubt about the significance of these organisms.

Manolov's "Shigella 13" has been fully examined by the International Shigella Centre at Colindale and has not been accepted as a member of the Shigella group. Nevertheless, on the strength of the positive kerato-conjunctivitis reaction produced in guineapigs he considers that it should be regarded as a true dysentery organism and that a new subgroup created, Shigella E, for its accommodation. Without more evidence of the value of the kerato-conjunctivitis reaction it seems unlikely that the test will be widely accepted as a reliable laboratory method for differentiating all true dysentery bacilli from non-dysentery bacilli.

H. J. Bensted

SINELNIKOV, N. A. **[Dysentery in the Turkmen SSR (Aetiology and Bacteriological Diagnosis)]**. 246 pp. 1958. Ashkhabad: Turkmen State Medical Institute.

In spite of the application of public health measures dysentery still presents a serious problem in Turkmenistan, and the incidence considerably exceeds the average for the Soviet Union as a whole. It is in an endeavour to provide the information which will be required for effecting an improvement in this situation that the author has written the present monograph.

The first chapter is devoted to the classification of the dysentery bacilli, and the system used in the Soviet Union since 1952 is described and compared with the international system. Four species are recognized; Grigorieva-Shiga, Shtutzer-Schmitz, Flexner (with the sub-species Flexner types I–VII), and Sonne. These species are in general co-terminous with their eq lents in the international system. The histor research in the bacteriology of dysentery is describe detail, from the reputed discovery of the first dyse bacillus by Grigoriev in 1891 to the establishmer the present-day systems of classification. The hi of dysentery in Turkmenistan is dealt with in the chapter, and the data in the Russian literature or isolation of strains of dysentery bacilli in various of the Republic are summarized in tables. Vari in *Shigella* is discussed in detail, with parti reference to the significance of atypical strains. species which has been most commonly encountere Turkmenistan is *Sh. flexneri* followed by *Sh. boydii sonnei* being encountered less frequently.

Other chapters are devoted to diagnosis, the o rence of *Shigella* phages in irrigation waters in T menistan, reversion of atypical strains of *Shigella*, the resistance of the prevalent strains to the stan chemotherapeutic agents. The monograph contai wealth of detailed information in the form of tables, closes with a bibliography of 621 Soviet and fo sources.

D. J. Bau

POGONOWSKA, J., ŚLOPEK, S. & MIKULASZEK, E. **Polysaccharide Fractions from Different T and Variable Forms of** *Shigella flexneri*. *Acad. Polonaise des Sci.* Warsaw. Sér. Sci. 1960, v. 8, No. 6, 233–5.

CEFALÙ, M. Le fimbrie in *Shigella flexneri* ed *Es richia coli* con particolare riguardo alle prop antigeniche. **[The Fimbriae of** *Sh. Flexneri E. coli* **with special reference to their Antig Character.]** *Riv. Istituto Sieroterap. Ital.* Jan.–Feb., v. 35, No. 1, 13–37, 9 figs. [22 r English summary.

Reference is made particularly to the work of Du and his colleagues in Edinburgh [this *Bulletin*, v. 31, 861; 1958, v. 33, 264; 1959, v. 34, 672; 1960, v (81)] in which the presence of fimbriae was shown t related to haemagglutinating activity in bacteria and to motility. It is suggested that these structures p ably have a rôle in bacterial nutrition although work of DUGUID and GILLIES, and of DOTTI CASETTA [*ibid.*, 1959, v. 34, 1040], tends to show virulence is more often associated with absenc fimbriae. Their own results fall into line with thos Duguid and others in alloting a special antigenic to the fimbriae.

141 *Shigella flexneri* strains were examined an these 32 were found to carry fimbriae and to ex haemagglutinating ability. With *Escherichia coli* characters were more frequent, being recognized i of 44 strains examined. There was no close conne however, between antigenic grouping by the methods and the presence or absence of fimbriae; *e.* the antigenic group O 25 of *E. coli* it was found tha 7 strains tested were positive, whereas in the O III g only 3 of 6 were positive.

Sera prepared with strains possessing fimbriae will glutinate other fimbriated strains of the same species d will prevent haemagglutination by such strains. rther, the antigenic behaviour of fimbriated strains in e shigella and *E. coli* groups show similarity but not entity. That is, there is cross-agglutination of a nbriated *E. coli* with an antiserum directed against a nbriated *Shigella flexneri* strain but the *coli* strain es not give complete absorption of the anti-fimbrial tibodies for the shigella strain.

The fimbrial activity (haemagglutination) disappears hen the bacteria are heated at 80°C. for 1 hour but t at lower temperatures.

There are a number of good reproductions of notomicrographs with the electron microscope.

J. W. McLeod

KALICKÝ, J., VANCURÍK, J. & WEBERSCHINKE, J. K otázce výskytu dyspeptických kmenů *Escherichia coli* v pitných vodách. [**The Occurrence of Pathogenic Strains of *Escherichia coli* in Drinking Water**] *Československ. Hyg.* Prague. 1960, v. 5, No. 5, 274–8. [10 refs.]

The English summary appended to the paper is as llows:—

"1. Serological examinations of 395 strains of scherichia coli, identified by biochemical methods, nd isolated from 2,069 specimens of drinking water om local and central sources revealed a total of 63 fferent types of dyspeptic E. coli, the cover glass gglutination method being used. Among these by the st tube agglutination method only five strains—type 26 and two strains type O 55 in titres above 1:160 ere confirmed.

"2. During the warm season of the year (May to eptember) the absolute and relative incidence of dyseptic strains of E. coli was significantly above the nnual average. Most of the strains were isolated from entral water supplies.

"3. In serological examinations of strains of E. coli, ispect of pathogenicity, as well as in examinations of inical material and in bacteriological examinations of rinking water it is absolutely necessary to use the test ube agglutination method in order to obtain reliable esults."

ONES, M. **Enteropathogenic *Escherichia coli* from Specimens of Non-Fecal Origin.** *J. Infect. Dis.* 1960, May–June, v. 106, No. 3, 304–10. [24 refs.]

"The enteropathogenic strains of *Escherichia coli* re not significant as causative agents in infections outde the intestinal tract. Only 8% of 511 strains of *sch. coli* from non-fecal sources have been shown erologically to belong to the 10 enteropathogenic roups. Half of these enteropathogenic strains elonged to O group 26, with fewer in O126, O111, 0119, O127, O128, and O86; three O groups were not epresented in this collection. No one source or type f specimen yielded any diarrheal group exclusively.

"A large majority of the enteropathogenic strains were susceptible to antibiotics and other chemotherapeutic agents.

"A comparison between strains from specimens of non-fecal and fecal origin demonstrated greater incidence of O26 and reduced incidence of O55 and O119 in the non-fecal specimens."

DEAN, A. C. R. & HINSHELWOOD, C. **Further Observations on the Adaptation of Coliform Bacteria to Sugars.** *Proc. Roy. Soc.* Ser. B. 1960, Mar. 1, v. 151, No. 945, 435–45, 7 figs.

This paper is an extension of previous work by the authors on the adaptation of bacterial cultures during the lag phase in media containing new sources of carbon which the bacterial cells are initially reluctant to use. There is often a progressive decrease in the time taken on a solid medium for colonies to develop to a standard size as the length of the previous exposure to lactose or D-arabinose in a liquid medium is increased.

The experiments are concerned with the adaptation *Bacterium coli mutabile* and *Bact. aerogenes* to lactose and D-arabinose respectively, and the times required for the colonies to reach a whole series of standard sizes are recorded and the size distributions determined. At certain stages in these experiments two types of colony can be distinguished in plated samples, an observation which might be held to support the mutational view that normal and mutant types of these organisms can be distinguished by this method. When, however, the size distribution of the colonies was subjected to detailed examination in the light of this contention the results were held to be inconclusive. *H. J. Bensted*

PFEIFER, U. Über Wirkungen von Dyspepsiecoli und ihren Endotoxinen auf Leukozytenbewegungen. [**The Effect of Bowel Pathogenic *Escherichia coli* Strains and their Endotoxins on the Motility of Leucocytes**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 177, No. 3, 309–31, 10 figs. [Numerous refs.]

The object of the investigation was to determine whether the pathogenic *coli* strains could be differentiated from others by their lethal action on leucocytes.

The technique adopted was to prepare very thin films of blood in chambers constructed by heat fixation of fine U-shaped strips of plastic (Parafilmfolie prepared by BRAUN of Melsungen) between slide and coverslip. The human blood used had a delayed coagulation time owing to incorporation of a trace of heparin and the blood-filled chambers were centrifuged so that when coagulated a sediment of blood with an upper layer of leucocytes and a clear thin film of plasma above was obtained. Leucotoxic effect was assessed by the failure of leucocytes to migrate into the plasma.

The bacteria investigated were incorporated in varying amounts with the blood and also the corresponding endotoxin preparation—lipo-polysaccharides (LPS). The LPS preparations were obtained from Professor WESTPHAL of the Wander-Forschungsinstitut in Freiburg. The bacteria brought under investigation were 5

pathogenic *coli* strains including the O 111 strain, 3 normal strains of *Escherichia coli* and 3 strains of *Salmonella*.

The general result of these elaborate investigations was to show that all bacteria investigated exerted some inhibiting effect on movement of the leucocytes which was significant for the larger amounts used. On decreasing the amount of bacterial suspension or endotoxin added, a corresponding drop in leucotoxic effect was obtained.

There was not, however, any adequate ground for differentiation between pathogenic and normal *coli* strains nor between these and the salmonellae which could be detected by the test used.

The lethal effect of the bacterial products on the leucocyte was only partly removed by heating at 100°C. for 10 minutes and could therefore be largely attributed to the O antigen. Neutralization of the effect of bacteria or endotoxin by antisera was not obtained.

J. W. McLeod

KURLAND, C. G. **Molecular Characterization of Ribonucleic Acid from** *Escherichia coli* **Ribosomes. I. Isolation and Molecular Weights.** *J. Molecular Biol.* London. 1960, June, v. 2, No. 2, 83–91, 6 figs. [19 refs.]

SCHLESSINGER, D. **Hypochromicity in Ribosomes from** *Escherichia coli*. *J. Molecular Biol.* London. 1960, June, v. 2, No. 2, 92–5.

ZUBAY, G. & WILKINS, M. H. F. **X-Ray Diffraction Studies of the Structure of Ribosomes from** *Escherichia coli*. *J. Molecular Biol.* London. 1960, June, v. 2, No. 2, 105–12, 4 pls. & 2 figs. [23 refs.]

DUNN, D. B., SMITH, J. D. & SPAHR, P. F. **Nucleotide Composition of Soluble Ribonucleic Acid from** *Escherichia coli*. *J. Molecular Biol.* London. 1960, June, v. 2, No. 2, 113–17. [27 refs.]

MATSUMOTO, H. & HARA, S. *Escherichia coli* **O124: K72(B): H12; a New Serotype of** *E. coli*. *Japanese J. Med. Sci. & Biol.* 1959, Dec., v. 12, No. 6, 471–2.

WIJESUNDERA, S., CROSS, M. J. & WOODS, D. D. **Vitamin B_6 and Glycine in the Synthesis of Methionine by Suspensions of** *Escherichia coli*. *J. General Microbiol.* 1960, June, v. 22, No. 3, 786–96, 2 figs. [20 refs.]

ASHWELL, G., WAHBA, A. J. & HICKMAN, Jean. **Uronic Acid Metabolism in Bacteria. I. Purification and Properties of Uronic Acid Isomerase in** *Escherichia coli*. *J. Biol. Chem.* 1960, June, v. 235, No. 6, 1559–65, 8 figs. [27 refs.]

HORECKER, B. L., THOMAS, Janine & MONOD, J. Ga tose Transport in *Escherichia coli*. **I. Gene Properties as studied in a Galactokinase Mutant.** *J. Biol. Chem.* 1960, June, v. 235, N 1580–85, 7 figs. [13 refs.] **II. Characteristics the Exit Process.** *Ibid.*, 1586–90, 7 figs.

HORIUCHI, S. **Alkaline Phosphomonoesterase form in Phosphate Deficient Phase of** *E. coli*. *Japan J. Med. Sci. & Biol.* 1959, Dec., v. 12, No. 6, 4 40, 8 figs. [34 refs.]

SAHAB, K. **Studies on** *Escherichia coli* **B and Antigens by Stained Capsular Reaction and their Occurrence as Capsules.** *J. Bacteriolo* 1960, June, v. 79, No. 6, 789–93. [10 refs.]

SCHWARTZ, J. H. & MAAS, W. K. **Analysis of Inhibition of Growth produced by Canavanine** *Escherichia coli*. *J. Bacteriology*. 1960, June, v. No. 6, 794–9, 2 figs. [16 refs.]

GREER, S. **Studies on Ultraviolet Irradiation** *Escherichia coli* **containing 5-Bromouracil in DNA.** *J. General Microbiol.* 1960, June, v. No. 3, 618–34, 6 figs. [28 refs.]

GILBERT, R. P. **Mechanisms of the Hemodynar Effects of Endotoxin.** *Physiol. Rev.* 1960, A v. 40, No. 2, 245–79. [227 refs.]

LIN, E. C. C., LEVIN, A. P. & MAGASANIK, B. **Effect of Aerobic Metabolism on the Induci Glycerol Dehydrogenase of** *Aerobacter aeroge J. Biol. Chem.* 1960, June, v. 235, No. 6, 1824 5 figs. [18 refs.]

YOSHIDA, N., FULUI, K., TANI, A. & FUKUI, R. **Stud on the Bacterial Cell Well. XV. Studies on Cell Wall Vaccine of** *Brucella abortus* **Ba** *Tokushima J. Exper. Med.* 1959, Nov., v. 6, No 167–78, 6 figs.

3 vaccines were prepared from the Bang strain 554 *Brucella abortus*: a normal bacterial suspension, a c wall vaccine and a cytoplasmic vaccine. The last were prepared by disintegrating a heavy whole-cell s pension and separating the two fractions as cell w and cytoplasm respectively. The whole-cell vacc was standardized at $0{\cdot}3 \times 10^{10}$ cells/ml. The cell-w vaccine contained approximately the same number cells and the cytoplasmic vaccine the correspond amount of the bacterial cytoplasm.

The agglutinin response to the whole-cell vaccine more rapid and reached a higher level than t observed with the other two vaccines. The cell-w vaccine was comparatively non-toxic for mice wher the others were markedly toxic, indicating that toxin resided in the cytoplasm. The cell-wall and whole-cell vaccines were equally effective in prevent power and were superior in this respect to the cy plasmic vaccine. Moreover, the weight curves of m

mmunized with the two former vaccines were hardly ffluenced by the challenge, while the mice receiving the toplasmic vaccine lost weight rapidly after challenge id this loss was not made up at all. Spleen and liver eights and also the number and size of granuloma llowed the same lines, the figures being much lower mice immunized with cytoplasm only.

It is considered that the results obtained with the ire cell-wall vaccine are very promising and that it ay be possible to prepare an effective killed *Brucella* accine by this method. *H. J. Bensted*

AGLE, S. C., Jr., ANDERSON, R. E. & GARY, N. D. **Chemically Defined Medium for the Growth of** *Pasteurella tularensis*. *J. Bacteriology*. 1960, Apr., v. 79, No. 4, 566–71, 1 fig. [11 refs.]

The data reported in this paper indicate that the rowth requirements of different strains of *Brucella ularensis* may vary considerably. Strains of reduced irulence tended to grow poorly in a medium devised or the maximal growth of strains of high virulence. uch strains required the addition of calcium panto- henate, or uracil, adenine and guanine to the medium ound optimal for virulent strains in order to obtain naximal growth. *H. J. Bensted*

ASPAR, A. J., WARD, Martha K. & TRESSELT, H. B. **Studies on** *Pasteurella tularensis*. **I. Effect of Duolite Treatment on Growth Promoting Properties of Blood and Plasma.** *J. Lab. & Clin. Med.* 1960, Apr., v. 55, No. 4, 633–8.

Duolite C−3H+ is one of the cationic exchange resins. t is a phenolic matrix with methylene sulphonic acid as he functional group and is manufactured by the Chemical Process Co., Redwood City, California. Duolite was found by HUDDLESON [this *Bulletin*, 1958, . 33, 276] to provide an agent which inactivates an nhibitory substance in normal blood which prevents he growth of *Brucella* organisms in media containing lood. The application of this observation to the study f *Brucella tularensis* has confirmed that treatment of lood and plasma with Duolite markedly enhances their rowth-promoting properties for this organism when lood or plasma from rabbit, sheep or man is used for aboratory culture media. Under such conditions it is ecessary to treat the culture media with Duolite before noculation and to ensure its removal before the intro- uction of the inoculum and incubation. The mechanism hat brings about this enhancement is not at present nderstood. *H. J. Bensted*

OLIADITSKAIA, L. S., KUCHINA, K. V. & SHMURYGINA, A. A. **Tularaemia Phage (Preliminary Communication).** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1959, v. 30, No. 3, 14–18, 7 figs. [Translated from Russian.]

In 1935 VOL'FERTS (*Rev. Mikrobiol., Epidemiol. & Parazit*, 1935, v. 14 [page not quoted]) discovered a tularaemia phage in an old culture of *Brucella tularensis*. The phage produced plaques on a film growth of the organism on solid medium but failed to clear the growth in a fluid medium. The present authors appear to have made their discovery accidentally during the preparation of supplies of tularaemia vaccine when they noted some curious-looking colonies with their surfaces covered with hemispherical alveoli. They were able to obtain cultures in fluid media by continual aeration and such cultures, spotted on film growths on solid media, resulted in plaque formation. This preliminary work confirms the observations of Vol'ferts but the authors are investigating further. *H. J. Bensted*

FELLMAN, J. H. & MILLS, R. C. **Succinoxidase System of** *Pasteurella tularensis*. *J. Bacteriology*. 1960, June, v. 79, No. 6, 800–806, 4 figs. [30 refs.]

BROWNLOW, W. J. & WESSMAN, G. E. **Nutrition of** *Pasteurella pestis* **in Chemically Defined Media at Temperatures of 36 to 38C.** *J. Bacteriology*. 1960, Feb., v. 79, No. 2, 299–304, 1 fig. [11 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin*, 1960, v. 57, 1057.]

SMITH, J. L. & HIGUCHI, K. **Studies on the Nutrition and Physiology of** *Pasteurella pestis*. **V. Inhibition of Growth by D-Serine and its Reversal by Various Compounds.** *J. Bacteriology*. 1960, Apr., v. 79, No. 4, 539–43, 2 figs. [17 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin*, 1960, v. 57, 1057.]

MEAD, Dorothy D., WESSMAN, G. E., HIGUCHI, K. & SURGALLA, M. J. **Stability of Cell Suspensions of** *Pasteurella pestis* **at 5C and at −23C.** *Applied Microbiol.* Baltimore. 1960, Jan., v. 8, No. 1, 55–60. [14 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin*, 1960, v. 57, 1056.]

LAWTON, W. D., FUKUI, G. M. & SURGALLA, M. J. **Studies on the Antigens of** *Pasteurella pestis* **and** *Pasteurella pseudotuberculosis*. *J. Immunology*. 1960, May, v. 84, No. 5, 475–9. [20 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin*, 1960, v. 57, 1057.]

BISSET, K. A. & HALE, C. M. F. **Flagellar Pattern and Growth of** *Bacillus* **spp.** *J. General Microbiol.* 1960, Apr., v. 22, No. 2, 536–8, 4 figs. on pl. & 2 text figs.

"Observations by electron microscopy and by light microscopy of material stained to demonstrate flagella and cell walls, simultaneously, showed that in non-filamentous *Bacillus* spp. the flagella of growing bacilli

were usually fully developed towards one pole, and developed on the other pole as the process of fission advanced. This is similar to the condition in other types of bacteria, previously described, and is in accordance with the theory that bacterial reproduction is not by simple fission, but by production of a bud from a mother cell."

BENNETT, E. O. & WILLIAMS, R. P. **Nucleic Acid Phosphorus Content of** *Bacillus anthracis* **and** *Bacillus cereus.* **I. The Nucleic Acid Phosphorus Content of Vegetative Cells.** *Japanese J. Microbiol.* 1959, July, v. 3, No. 3, 285–91. [22 refs.]

KOHIYAMA, M. & IKEDA, Y. **Appearance of New Deficient Characters in Streptomycin-Resistant Mutants of** *Bacillus subtilis.* [Correspondence.] *Nature.* 1960, July 9, v. 187, 168–9, 1 fig.

NIKONOV, A. G., KHOKHLOVA, A. M., BICHUL, K. C. & TIMOFEEVA, R. I. **Cholera Phage.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1959, v. 30, No. 1, 118–26. [Translated from Russian.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 1061.]

FORMAL, S. B., BOHNER, H., SCHNEIDER, H. & BARON, L. S. **Virulence of a Nutritional Mutant of** *Vibrio comma. Proc. Soc. Exper. Biol. & Med.* 1960, Feb., v. 103, No. 2, 359–61.

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 1061.]

MIŚRA, S. B. & SHRIVASTAVA, D. L., with the technical assistance of S. SINGH. **Studies in Immuno-Chemistry of** *Vibrio cholerae*: **Part I—Localization of Antigens in the Cells.** *J. Sci. & Indust. Res.* New Delhi. 1959, Nov., v. 18C, No. 11, 209–12, 1 fig. [10 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 1062.]

DE, S. N., GHOSE, M. L. & SEN, A. **Activities of Bacteria-Free Preparations from** *Vibrio cholerae. J. Path. & Bact.* 1960, Apr., v. 79, No. 2, 373–80, 3 figs. on pl. [11 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 906.]

GOTO, S., OTA, K. & KUWAHARA, S. **Studies on the Purine Requirements of Vibrio El Tor.** *Japanese J. Microbiol.* 1959, Apr., v. 3, No. 2, 223–30, 3 figs. [14 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 906.]

KRAMINSKAIA, N. N. **The Results of a Study of so Far-Eastern Strains of Pathogenic Leptospires New Serological Types.** *J. Microbiol., Epidemi & Immunobiol.* London. 1959, v. 30, No. 3, 66–7 1 fig. [10 refs.] [Translated from Russian.]

The following leptospires have been found in t Primorsk krai [the maritime province opposite Sakha and Japan] between 1937 and 1950: *L. grippotypho L. pomona, L. FE-A* [sic], *L. canicola* and *L. hebdon dis.* Later, 3 other serotypes were found: *L. mu* (strain WM) isolated from white mice; *L. saxkoebi* (strain P-183), from reed voles [this *Bulletin,* 1956, v. 325]; and *L. ussuri* (strain DV-P) from a human patie in 1952.

The bulk of this paper deals with some of t characteristics of *L. ussuri,* of which 10 other strai have been isolated from human beings; but a br report is added of cross-agglutination and absorpti studies of some of the other strains mentioned above.

L. ussuri could not be cultured directly from hum blood in the usual media: preliminary inoculation guineapigs, and culture of their blood, was necessa Substances which inhibit the multiplication of *L. uss* are present in the blood of 97% of the local rabbi but no lysins could be demonstrated. Heating at 93° for 2 minutes renders 40% of such rabbit sera fit f use. Although *L. ussuri* will not multiply in media co taining thiamine or top yeast, Verwoort-Wolff medi with added yeast lysate is suitable. The lysate w prepared as follows: 10 gm. dried yeast was well mix in 90 ml. distilled water for 15–20 minutes, then boil for 3–5 minutes; the lysate was filtered through tw layers of fllter paper into sterile tubes and sterilized f 20 minutes at 110°C. If kept in the dark at 6–8°C. was fit for use for 7 days. To 3 ml. of medium, 3 or drops of lysate are added. The leptospires can be gro in ordinary media after they have become adapted yeast lysate media.

In guineapigs, *L. ussuri* causes pyrexia (lasting 1 days) between 3 and 10 days after subcutaneous intraperitoneal inoculation: during this period t organisms could be found, by direct microscopy, in t peritoneal exudate (8/21), in the blood (7/21), or both (2). The animals do not become jaundiced b may die, only after primary infection (4 out of Agglutinins were demonstrable in surviving guineapi but no leptospires were seen in the urine and no mark pathological lesions were found. Attempts to transm the infection by using parenchymatous organs faile the recipient animals remained afebrile and no ar bodies could be found after 5–6 weeks.

L. ussuri was found to be the cause of 60% of se logically confirmed human cases, and of 59% of bovi cases of leptospirosis in the Far East region of Russ [The clinical picture was described earlier, by ESKIN *al.,* see *ibid.,* 1959, v. 34, 1112.]

L. saxkoebing affects man less frequently: but it not uncommon in reed voles and other rodents, as w as in foxes and other mammals preying on rodents. *muris* is prevalent in white mice in the eastern parts the U.S.S.R.

Cross-agglutination and absorption tests showed t

train P–183, *L. nero* (strain Titova), and *L. saxkoebing* strain Šaca) belonged to the same serotype. *L. muris* strain WM) was identical with strain Egoshin (isolated rom a human patient: the first report of a human nfection with *L. muris*). *L. H. Turner*

DAVIES, M. Elizabeth. **Observations on Leptospiral Antibodies occurring in Pig Sera.** *J. Hygiene.* 1960, June, v. 58, No. 2, 243–6. [14 refs.]

"A total of 849 samples of pig sera were tested for ntibodies to *L. canicola, L. icterohaemorrhagiae, L. omona, L. ballum, L. sejroe, L. grippotyphosa, L. hyos mitis* Johnson), and *L. bataviae.* Positive results were btained in 57 samples to all but the last three erotypes."

LEIGHT, S. D., LANGHAM, R. F. & MORTER, R. L. **Experimental Leptospirosis: the Early Pathogenesis of *Leptospira pomona* Infection in Young Swine.** *J. Infect. Dis.* 1960, May–June, v. 106, No. 3, 262–9, 8 figs. [21 refs.]

FAINE, S. **Catalase Activity in Pathogenic Leptospira.** *J. General Microbiol.* 1960, Feb., v. 22, No. 1, 1–9, 5 figs. [10 refs.]

The author earlier showed that leptospires need aemoglobin or $FeCl_3$ for satisfactory growth in Korthof medium [this *Bulletin,* 1959, v. 34, 1180]. Later, assuming that haemoglobin or iron might be equired for Fe-porphyrin-containing enzymes, he tested ultures of various leptospires for catalase and oxidizing nzyme activity and obtained positive results; these led o the present study.

In this paper the author describes experiments which how that catalase activity, of an order comparable with hat of aerobic bacteria, occurs among many strains of eptospire. The catalase, the general properties of which re similar to other bacterial catalases, appeared to be rregularly distributed among the strains tested without ny relation to serotype or virulence.

It is suggested that other biochemical tests applicable o plate cultures of leptospires may aid in diagnosis and axonomy. *L. H. Turner*

VAN RIEL, J. Les hémolysines leptospiriennes. [**Leptospire Haemolysins**] *Ann. Soc. Belge de Méd. Trop.* 1959, June 30, v. 39, No. 3, 331–41. [16 refs.]

The author, having briefly reviewed the unsatisfactory ituation as regards the classification and nomenclature f the leptospires, reaffirms the view that all attempts ave so far failed to define a criterion of differentiation ther than one based on antigenic characteristics.

In 1956, a haemolytic factor in cultures of some, but ot all, leptospires was discovered independently by ALEXANDER *et al.* [this *Bulletin,* 1956, v. 31, 953], and RUSSELL [*Ibid.,* 1957, v. 32, 998] who thought it might explain the pathogenicity of leptospiral infections. BAUER and MORSE, however, failed to show any correlation between haemolytic potential and virulence of strains of *Leptospira pomona* [this *Bulletin,* 1959, v. 34, 577].

The author was more interested in the possibility that the haemolytic factor could be used as a criterion of differentiation. He therefore investigated this property in 70 strains maintained in his laboratory, using Russell's technique, slightly modified. The results, tabulated alongside those of Alexander *et al.* and Russell (and in the classification advocated by WOLFF and BROOM [*Ibid.,* 1954, v. 29, 877, 878–9]) indicate that there is not complete agreement. The discrepancies may perhaps be due to differences in techniques or in the strains used.

The author concludes that further study is required to determine whether or not the haemolytic factor in certain leptospires is sufficiently constant for it to be useful as a differential criterion. *L. H. Turner*

ROTHSTEIN, N. & WOLMAN, Flora. **Studies of the Immunochemistry of Leptospires. III. Serologic Characterization of the Complement-Fixation Antigen.** *J. Infect. Dis.* 1959, Nov.–Dec., v. 105, No. 3, 280–87. [11 refs.]

A 70% ethanol extract of leptospires, from which the ethanol had been removed, yielded 2 phases after electrodialysis and centrifugation: one, water-soluble, was described by ROTHSTEIN and HIATT, and by ROTHSTEIN [see this *Bulletin,* 1957, v. 32, 502; 1958, v. 33, 703]. The present paper deals with the other, water-insoluble phase which these authors referred to as the complement-fixation (CF) antigen.

CF antigens, prepared from strains of *Leptospira pomona* and *L. bataviae,* were used to test 36 various rabbit hyperimmune sera by the HL technique of COX [*Ibid.,* 1956, v. 31, 749]: positive reactions (1/1,000 to 1/40,000 or higher) were obtained in all cases. Moreover, a CF antigen prepared from *L. grippotyphosa,* a serotype hitherto reported to be refractory to the preparation of HL antigen [*Ibid.,* 1957, v. 32, 998], reacted with 15 out of 19 sera tested by the HL technique. CF antigens (*L. pomona,* 2 strains; *L. andaman; L. grippotyphosa*; *L. haemolyticus*) also gave positive reactions against all sera tested by the CF 52 technique [of which no details are given].

Sera of 35 human cases of suspected leptospirosis from Malaya were tested by the HL technique with HL antigen (*L. biflexa*) and CF antigen (*L. pomona*). These sera were also tested by the CF 52 technique with antigens of different ages (*L. pomona,* 6 months; *L. bataviae,* 20 months; *L. pomona* S-91, 38 months). Apart from the CF 52 tests with the two older antigens, which were less sensitive, there was no difference in the ability of the various antigens to detect positive reactions; nor were the rates of positive reactions significantly different from that shown by the microagglutination (MA) test using live antigens.

In HL tests with sera from 16 confirmed cases of leptospirosis, a 7-month-old CF antigen (*L. pomona*)

and a 1-week-old HL antigen (*L. biflexa*) gave positive reactions in 14/16 and 15/16 cases respectively. The MA test was negative with 7 of these sera, but all except one were obtained in the first 3 days of illness.

When CF antigen was treated with NaOH for 18–24 hours, titres in the HL test were usually increased 10- to 100-fold; and in 4 instances a positive reaction was obtained with sera which were negative against both HL antigen and untreated CF antigen.

CF antigen (*L. pomona*) gave positive reactions in the CF 52 test against all of 14 bovine sera and in the HL test with 9. This is interesting because hitherto bovine sera have been reported to be refractory in tests with HL antigens.

The authors state that their CF antigens have remained serologically reactive for 4 years and more when kept in aqueous suspensions at 4°C.

Also of interest was the finding that experimentally modified fractions [details given] of CF antigen were able to protect hamsters against a heavy challenge and without always stimulating detectable agglutinins.

The authors state that the broad reactivity, the stability, and the capacity of these CF antigens to react with bovine sera, are all qualities which make them especially useful for epidemiological surveys of human and animal leptospirosis. *L. H. Turner*

SMITH, C. W., MARSHALL, J. D., Jr. & EVELAND, W. C. **Identification of *Listeria monocytogenes* by the Fluorescent Antibody Technic.** *Proc. Soc. Exper. Biol. & Med.* 1960, Apr., v. 103, No. 4, 842–5. [21 refs.]

Fluorescein-labelled somatic, flagellar and whole cell antibodies to ATCC strains of *Listeria* were employed to determine the specificity of fluorescent antibody technique in rapid identification. Saline suspensions of the organisms to be tested were smeared on slides, air-dried and heat-fixed. Smears were overlaid with labelled sera and left at 37°C. for 30 minutes. Controls were stained with labelled pooled normal rabbit serum and labelled antiserum to *Erysipelothrix insidiosa*. 30 strains of *Listeria* from human and animal isolates were tested against the specific labelled sera. All strains fluoresced after treatment with their type-speci labelled sera, but not with either of the control se Not all strains were detected by individual somatic an sera, but all fluoresced with a polyvalent serum. T flagellar and whole cell antisera did not fluoresce wi all strains. The labelled sera were tested against 1 different strains of bacteria but these gave no speci reaction.

There are limitations in this technique when it applied to the diagnosis of infectious mononucleos Sera from 8 patients gave specific fluorescence wh tested against 16 types of *Listeria*. 25 normal hum sera obtained as controls also gave fluorescence. Ca must be taken in the interpretation of resul "Normal" control sera must be characterized alo with the immune sera. Minor cross-reactions whi may exist between bacteria, viruses and fungi, a which are detected by this method, may interfere w the results. *May F. McCallum*

FREEDMAN, H. **Passive Transfer of Tolerance to Py genicity of Bacterial Endotoxin.** *J. Exper. Me* 1960, Apr. 1, v. 111, No. 4, 453–63, 4 figs. [16 ref

"The typical febrile response of normal rabbits giv bacterial endotoxin intravenously may be modified prior administration of plasma or, less effectively, ser of endotoxin-tolerant donors. This altered response characterized by disappearance of the second rise fever and by a striking reduction in fever index. It th resembles the course of fever shown by rabbits ma tolerant to endotoxin by one or more previous da doses. This transfer of tolerance by plasma or ser depends critically upon the manner in which tolera is induced in the donors.

"The plasma of donor rabbits made tolerant, th given an RES-blocking dose of carbon, still conf tolerance upon normal recipient rabbits. Such don have lost their tolerance and are highly sensitive to en toxin at the time their blood is taken.

"The implications of these findings for endoto tolerance and for transfer of this phenomenon are c cussed. The evidence is consistent with the hypothe that both tolerance and its transfer are based upon R function and are independent of antibody." [See p. 106

RICKETTSIAE

WEISS, E. & DRESSLER, H. R. **Centrifugation of Rickettsiae and Viruses onto Cells and its Effect on Infection.** *Proc. Soc. Exper. Biol. & Med.* 1960, Apr., v. 103, No. 4, 691–5. [14 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin*, 1960, v. 57, 1038.]

BOVARNICK, Marianna R. & SCHNEIDER, L. **The Incorporation of Glycine-1-C^{14} by Typhus Rickettsiae.** *J. Biol. Chem.* 1960, June, v. 235, No. 6, 1727–31. [18 refs.]

[An abstract of this paper appeared in the *Tropi Diseases Bulletin*, 1960, v. 57, 1038.]

PSHENICHNOV, R. A. **The Use of Radioactive Rad tion for the Preparation of Rickettsial Antige** *J. Microbiol., Epidemiol. & Immunobiol.* Lond 1959, v. 30, No. 3, 149–52. [Translated fr Russian.]

[An abstract of this paper appeared in the *Trop Diseases Bulletin*, 1960, v. 57, 1038.]

RYGIN, C. Aktywnośc serologiczna antygenu rozpuszczalnego *R. prowazeki.* [**Serological Activity of the *R. prowazeki* Soluble Antigen**] *Med. Dośw. i Mikrob.* Warsaw. 1960, v. 12, No. 2, 167–74, 4 figs. [13 refs.] English summary.

[An abstract of this paper appeared in the *Tropical iseases Bulletin,* 1960, v. 57, 1039.]

REIFF, D., POWERS, E. L., KISIELESKI, W. E. & PINKERTON, H. **The Effects of X-Rays and Beta Rays (Tritium) on the Growth of** *Rickettsia mooseri* **and** *Rickettsia akari* **in Embryonate Eggs.** *J. Exper. Med.* 1960, June 1, v. 111, No. 6, 841–9. [15 refs.]

[An abstract of this paper appeared in the *Tropical iseases Bulletin,* 1960, v. 57, 1041.]

WEYER, F. Experimente mit einem Stamm von Zeckenbissfieber aus Nordqueensland. [**Experiments with a North Queensland Strain of Tick-Bite Fever**] Reprinted from *Schweiz. Ztschr. f. Allgemeine Path. u. Bakt.* 1959, v. 22, No. 5, 609–20, 6 figs. [10 refs.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 1043.]

IGNATOVICH, V. F. **A Contribution to the Question of the Retention of** *Rickettsia burneti* **on Objects of the External Environment.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1959, v. 30, No. 5, 156–7. [Translated from Russian.]

[An abstract of this paper appeared in the *Tropical Diseases Bulletin,* 1960, v. 57, 1044.]

BACTERIOPHAGES

KU, T., MIKI, K. & MATSUSHITA, H. **Conditions for Phage Multiplication in Induced Lysogenic Bacteria and Infected Bacteria; Effects of Visible Light Illumination.** *Wakayama Med. Reps.* 1960, Jan., v. 5, No. 1, 29–42, 2 figs. [16 refs.]

Bacteria which have been exposed to visible light annot support phage multiplication, but they recover ie lost ability if incubated in broth before infection HILL, this *Bulletin,* 1957, v. 32, 73]. Cultures of *scherichia coli* B or K12 were illuminated under given onditions and then infected with different multiplicities f T2. (Illumination did not affect bacterial viability id illuminated cells adsorbed phage normally.) The laque-forming ability of infected cells fell to about 2% whatever the multiplicity of infection. When cells ere illuminated at intervals after infection, phage ynthesis was inhibited until about 13 minutes. At this me the first complete phage particles can be detected ıtracellularly so that light evidently interferes with ome stage in synthesis before maturation. Cultures of . *coli* K.12 (λ) were illuminated, transferred to broth id then, at intervals, induced with UV light. Comared with cells kept in the dark, only a small proporon of cells produced phage on induction immediately fter illumination. This number increased as the length f time of incubation before induction increased, and y the time cell division resumed the proportion yieldg phage was the same as in the control. The recovery f the ability to support phage synthesis after incubaon in broth was prevented by concentrations of NaF, aCN and chloramphenicol which just inhibited cell vision but did not interfere with normal plaque formg ability. UV irradiation did not inhibit the recovery rocess.

These experiments provide further evidence that the ate of the host cell can determine the course of phage fection. *Janice Taverne*

UPTA, B. M. & KRISHNA MURTI, C. R. **Human Intestinal Bacteriophage. Part IV: Resistance of *Escherichia coli* (Strain Kasauli) to Coli-Dysentery Phage CVX–5.** *Ann. Biochem. & Exper. Med.* Calcutta. 1960, Jan., v. 20, No. 1, 21–30, 2 figs. [20 refs.]

RC_1, a strain of *Escherichia coli,* was derived from a colony of *E. coli* (K) which had resisted lysis by the coli-dysentery phage CVX–5. Its properties were examined for other changes besides the acquisition of phage resistance. No differences were found in fermentation reactions or other biochemical tests between RC_1 and *E. coli* (K). Both strains were sensitive to lysozyme and they possessed the same sensitivity to antibiotics. But *E. coli* (K) grew in a medium containing lactate as the only source of carbon while RC_1 did not. The addition of folic acid or various amino acids or carbohydrates did not allow growth of RC_1 but its growth resumed when purines were added to the medium. That is, the phage-resistant mutant was also found to be a purine-requiring auxotroph. It was, however, able to synthesize the adaptive enzyme β-galactosidase in the absence of purines. *Janice Taverne*

BEUMER, J. & DIRKX, J. Influence de la composition cationique du milieu sur la fixation des bactériophages sur les récepteurs bactériens isolés. [**Influence of Cationic Constitution of the Medium on Phage Fixation onto Isolated Bacterial Receptors**] *Ann. Inst. Pasteur.* 1960, July, v. 99, No. 1, 146–50.

KELLENBERGER, G., ZICHICHI, M. L. & WEIGLE, J. **Mutations affecting the Density of Bacteriophage λ.** [Correspondence.] *Nature.* 1960, July 9, v. 187, 161–2.

CAMPBELL, A. **On the Mechanism of the Recombinational Event in the Formation of Transducing Phages.** *Virology.* New York. 1960, June, v. 11, No. 2, 339–48, 3 figs.

VIRUSES

The order in this section is:—**General; Psittacosis-Lymphogranuloma group; Pox group; Respiratory group; Reovirus group; Enteric group; Arthropod-borne group; Others.**

HORSFALL, F. L., Jr. **Viral Infection and Viral Disease in Man.** *Proc. Staff Meetings Mayo Clinic.* 1960, May 25, v. 35, No. 11, 269–82, 3 figs.

This is a brief review of recent advances in animal virology and useful to the general reader. The physical and chemical nature of viruses is briefly discussed with emphasis on the genetic mechanism which resides in the nucleic acids. The nature of the cell damage caused by virus infection with particular reference to the use of tissue cultures is then considered. The types of human disease caused by the 5 major virus groups are described: arbor-, adeno-, entero-, herpes-, and myxo-viruses. Encephalitis can be caused by viruses in several groups, as can meningitis and respiratory disease. Very good laboratory facilities are therefore essential for diagnosis. Although some chemical inhibitors of viral multiplication are known they are not yet capable of therapeutic use, firstly because most viral multiplication occurs during the incubation period and is unrecognized, and secondly, because such substances also have adverse effects on the metabolism of the host cells. *C. E. Gordon Smith*

BURNET, F. M. **Principles of Animal Virology.** 2nd Edition.

This book was reviewed on p. 836.

BACT. REVIEWS. 1959, Dec., v. 23, No. 4, 202–49, 36 figs. [Numerous refs.] **Symposium on the Biology of Cells modified by Viruses or Antigens.**

This symposium consists of 4 papers presented at the Annual Meeting of the Society of American Bacteriologists in St. Louis, Missouri, in May 1959. In the first paper L. BARKSDALE (*Lysogenic Conversions in Bacteria,* pp. 202–212) discusses some modifications in the synthetic activity of bacteria produced by phage. The serotype of certain strains of *Salmonella* can be changed by lysogenization with temperate phages, probably as the result of changes in polysaccharide synthesis brought about by the phage. In the phage-induced toxigenicity of *Corynebacterium diphtheriae,* on the other hand, the new product formed under the influence of the phage is a protein; it differs also from the phage-induced polysaccharides of *Salmonella* in that it appears only when the growth of the culture is declining.

The relation of cells to antibody production is discussed by G. ATTARDI, M. COHN, K. HORIBATA and E. S. LENNOX (*On the Analysis of Antibody Synthesis at the Cellular Level,* pp. 213–223), who have developed a method for measuring the production of antibody by single cells isolated from the lymph nodes of rabbits immunized with the T2 and T5 phages of *Escherichia coli.* The cells are incubated under oil in microdrops to which T1, T2 and T5 phages have been added; drops are then recovered and the amount of antibo produced can be determined from the amount of and T5 phages neutralized. The volume of the mic drop is determined from the amount of T1 ph present. The cells can also be isolated in micropipet Detectable antibody was formed in microdrops by of 925 (10·3%) lymph node cells examined; 5·1% cells produced T2 antibody, 2·9% produced T5 a body, and 2·3% produced both antibodies. The res also suggest that the cell population used contains 1 of potential antibody-producing cells and 83% of in cells. Antibody was produced by both plasma c and lymphocytes.

The subject of animal viruses is introduced by A. GRAHAM (*Physiological Conditions for Studies of V Biosynthesis in Mammalian Cells,* pp. 224–231), w particular reference to the use of viruses contain ribonucleic acid as a tool for studying the synthesis ribonucleic acid in the cell. The requirements for s a model system are that the virus should not be lar than 20–30 mμ in diameter, should contain o ribonucleic acid and protein, should be thermosta and should give a yield of at least 500 particles; the c should be a selected clone with a constant rate multiplication. These requirements are not easy satisfy, but the authors have found that Mengo vi growing in L cells forms a suitable system, provi that the cells are grown in suspension. The cells be maintained permanently in exponential growth subculturing during the exponential growth period, the contents of protein, ribo- and deoxyribo-nuc acid per cell remain constant under these conditi affording a baseline against which the changes indu by the virus infection can be measured.

The aspect of the cell in the cell-virus relationshi stressed by P. I. MARCUS (*Single-Cell Techniques Tracing Virus-Host Interactions,* pp. 232–249). infecting single cells and then plating them the kil of the cell by the virus can be studied. When H cells are exposed to increasing multiplicities of N castle disease virus the proportion surviving falls first in the expected manner, but then rises again multiplicities between 14 and 20. This cell-spa phenomenon is attributed to excessive elution attached virus particles, which adversely affects pene tion in some way. *D. J. Bau*

MAIR, Hélène J. & TOBIN, J. O'H. **Some Observati on the Use of Secondary Monkey Kidney C Cultures for the Routine Diagnosis of Vi Diseases.** *Monthly Bull. Ministry of Health & P Health Lab. Service (directed by Med. Res. Coun* 1960, Apr., v. 19, 49–54.

Today a virus diagnostic laboratory requires a c tinuous supply of tissue culture cells. In general

eatest success in isolating new viruses has been hieved by using monkey kidney cells, but these are ry uneconomical for the small laboratory. There will , therefore, considerable interest in the successful ansmission of trypsinized monkey kidney cells by post scribed in this paper. Full details are given, but sentially trypsinized monkey kidney cells are grown all 6 sides of a baby feeding bottle slowly rotated a drum. After 5–7 days the growth medium is moved and the bottle completely filled with new edium which contains additional bicarbonate. Bottles ere sent by express post from London to Leicester and ually arrived next day. The cells were removed from e glass with versene and resuspended in transit edium at a concentration of 10^5 cells per ml. and used prepare secondary cultures. About 150 tubes were btained from 1 bottle. In 9 months 26 out of 29 ottles were successful, although 3 of these produced nly fair or poor quality cells

A comparison of the performance of the secondary onkey kidney cells with human amnion and a con-nuous line of monkey kidney cells MK2 [Westwood *al.*, this *Bulletin*, 1957, v. 32, 815] is presented. The onkey kidney cells were less satisfactory than the ther 2 types of cells for isolating adenoviruses but ightly superior for isolating some enteroviruses. With nly MK2 cells 27 virus isolations would have been issed whereas with MK2 plus human amnion 4 would ave been missed and with MK2 plus secondary monkey idney cells 5 would have been missed. It is concluded at for routine diagnostic work continuous cells should e supplemented by human amnion or monkey kidney ells. The ease of preparing monkey kidney cells as escribed makes the authors favour these. However, ey also warn that such cells may contain simian iruses, especially haemadsorption viruses (*Myxovirus arainfluenzae*), which may confound attempts to isolate iruses. The incidence of simian viruses can, however, e greatly reduced by quarantining the monkeys 2 to a age for 6 weeks before removing their kidneys.

A. J. Beale

ULTON, F. **Tissue Culture on Polythene.** *J. General Microbiol.* 1960, Apr., v. 22, No. 2, 416–22, 8 figs. on 2 pls.

This paper gives a full account of a novel tissue ulture method. Fragments of tissue are squashed onto mall polythene discs which are floated in small cups f a simple maintainance medium which is buffered ith phosphate. Embryonic cells grow out quickly and dult tissue survives for several days as a layer only a ew cells thick. The disc and cells are mounted in the resh or fixed state and examined by phase contrast icroscopy. With chick embryo tissue cultured in these onditions it was found that Semliki Forest virus pro-uced a marked cytopathic effect and that heamadsorp-on could be detected in tissue fragments infected with R8.

D. A. J. Tyrrell

Lindenmann, J. Neuere Aspekte der Virus-Interferenz. [**Recent Aspects of Virus Interference**]. *Ergebn. Mikrobiol. Immunitätsf.* 1960, v. 33, 369–97. [Numerous refs.]

Interference was first observed in 1935, and for a good many years experimental work on this subject was devoted to the study of interference between live viruses. In 1943 interference was observed with inactivated influenza virus and subsequent work in this direction has led to the discovery of interferon and the investigation of its properties. The present review has 3 main sections; the first is an introduction, the second deals with interference by an inactivated virus, and the development of the concept that interference was not due to competition for growth factors but to the formation of a substance of some kind. The first demonstration of the existence of this material, now known as interferon, was given in 1957 [this *Bulletin*, 1957, v. 32, 1203], when it was found that pieces of allantoic membrane previously exposed to inactivated influenza virus liberated a substance with the medium which rendered pieces of normal membrane resistant to infection. The third part of the review is devoted to a description of the properties of interferon.

D. J. Bauer

Hiatt, C. W., Kaufman, Eleanor, Helprin, J. J. & Baron, S. **Inactivation of Viruses by the Photodynamic Action of Toluidine Blue.** *J. Immunology.* 1960, May, v. 84, No. 5, 480–84, 3 figs. [29 refs.]

Different viruses were mixed with toluidine blue and their rates of inactivation by light determined in given conditions. The rate of inactivation was characteristic of each virus. In most cases the survival curve showed a lag phase before a linear part which had a reproducible slope. Phage T3 showed the greatest rate of inactivation and was used as a standard. Of the viruses tested, vaccinia, after a longer lag period, was inactivated at the same rate as T3, 3 adenoviruses were inactivated more slowly but at the same rate as each other, and the enteroviruses (1 ECHO, 3 types of polio and 2 Coxsackies) were inactivated more slowly still.

The authors suggest that the dye combines with the virus at sites essential for infectivity providing "marked targets" and that it then absorbs light of specific quantum energy, which energy it transfers to the virus particle at the site of combination. *Janice Taverne*

Peters, D. Struktur und Entwicklung der Pockenviren. [**Structure and Development of Poxviruses**] Reprinted from *Vierter Internationaler Kongress für Elektronenmikroskopie.* [**Fourth International Conference on Electron Microscopy**] Berlin, 10–17 September 1958. 1960, v. 2, 552–73, 18 figs. [83 refs.] Berlin. Göttingen. Heidelberg: Springer-Verlag.

JOKLIK, W. K.; WOODROOFE, Gwendolyn M.; HOLMES, I. H.; FENNER, F.; BRIGGS, Margaret J. **The Reactivation of Poxviruses. I. Demonstration of the Phenomenon and Techniques of Assay.** JOKLIK, WOODROOFE, HOLMES & FENNER]. *Virology*. New York. 1960, May, v. 11, No. 1, 168–84, 3 figs. [19 refs]. **II. The Range of Reactivating Viruses** [FENNER & WOODROOFE]. *Ibid.*, 185–201. [23 refs.] **III. Properties of Reactivable Particles** [JOKLIK, HOLMES & BRIGGS]. *Ibid.*, 202–18, 8 figs. [11 refs.]

GEMMELL, Anne & FENNER, F. **Genetic Studies with Mammalian Poxviruses. III. White (*u*) Mutants of Rabbitpox Virus.** *Virology*. New York. 1960, May, v. 11, No. 1, 219–35, 3 figs. [12 refs.]

KAPLAN, C. **Titration of Vaccinia Virus by Intravenous Injection of Chick Embryos.** *Bull. World Health Organization*. Geneva. 1960, v. 22, Nos. 3/4, 393–7, 1 fig. [11 refs.]

The author has compared the results obtained in the titration of 3 strains of vaccinia virus by the intravenous injection of chick embryos by the method of BEVERIDGE and BURNET [this *Bulletin*, 1947, v. 22, 89] and by a conventional pock-counting method. The embryos were inoculated with serial decimal dilutions of virus and the LD50 was determined from the number of embryos which had died after 7 days; embryos inoculated on the 10th day of incubation were found to give higher titres than embryos inoculated on the 12th day. In 23 titrations carried out in parallel by the 2 methods the coefficient of the regression of the log intravenous LD50 upon the log pock count titre was 0·83. The LD50 titres in 13 replicate titrations of 3 standard virus preparations carried out over a period of 12 months showed a range of variation no greater than 4-fold. The good reproducibility of the intravenous method would be outweighed in practical conditions by the fact that it is more time-consuming than pock count titrations. *D. J. Bauer*

CARRÈRE, L., MANDIN, J. & POURQUIER, M. La multiplication du virus vaccinal en cultures cellulaires. Étude cytologique. [**Propagation of Vaccinia Virus in Tissue Cultures. Cytological Studies**] *Ann. Inst. Pasteur*. 1960, May, v. 98, No. 5, 682–7, 6 figs. on 2 pls.

Cells of various kinds in culture were exposed to infection by vaccinia virus either without or with vaccinia-immune serum in the medium. Cell cultures prepared from the kidneys of vaccinia-immune rabbits were also used. No inclusions typical of vaccinial infection were found. The authors do, however, describe Feulgen-negative inclusions in the cytoplasm. [For an earlier study, see this *Bulletin*, 1960, v. 35, 934.] *Colin Kaplan*

NISHIMURA, C. & TAGAYA, I. **Metabolic Alteration Nucleotides and Nucleic Acids in HeLa C infected with Vaccinia Virus.** *Japanese J. M Sci. & Biol.* 1959, Dec., v. 12, No. 6, 405–20, figs. [31 refs.]

WATKINS, J. F. **The Adsorption, Penetration Eclipse of Herpes Simplex Virus in Cho Allantoic Membrane Ectoderm.** *J. General Mi biol.* 1960, Feb., v. 22, No. 1, 40–56, 3 figs. refs.]

Adsorption of herpes simplex virus (Nash strain the chick chorioallantoic membrane (CAM) was n sured by washing the CAM at intervals after inoc tion and measuring both unadsorbed virus in washings and adsorbed virus which later gave rise pocks on the washed CAM. The same results w obtained by both methods. Over 90% of the virus adsorbed in 2 hours and the rate of adsorption follo first order kinetics. Adsorption was faster at 37 than at 4°C. but this could be explained by slo diffusion at 4°C. Adsorption was not reduced by h ing the CAM to 60°C. for 2 hours before adding vi nor by pretreating the CAM with CAM antiserum. decrease in infectivity was observed when virus added to the deposit obtained by grinding frozen C in a mortar and centrifuging at low speed. This sugg that any specific receptor material only binds vi irreversibly in intact cells.

After adsorption for 30 minutes only about 0·1% the virus could ever be recovered from the CA Experiments in which herpes antiserum was added CAM at intervals after infection indicated that 40–7 of the adsorbed virus could still be neutralized. Vi gradually became less susceptible to antibody dur the 3 hours after adsorption. The adsorbed virus wh later penetrated the cell to give rise to new virus t appeared to lose its infectivity when at least half o could still be neutralized by antiserum. Since this l of infectivity must therefore occur at the cell surfa the author doubts if it should properly be called 'eclipse' as this is usually understood to involve intracellular alteration before replication begins. T same phenomenon has been reported for poliomyel [PAYNE *et al.*, this *Bulletin*, 1958, v. 33, 997] and influenza [ISHIDA and ACKERMANN, *Ibid.*, 1957, v. 210] and the author suggests that it may be a gene feature in virus multiplication. *Janice Tavern*

WATKINS, J. F. **The Early Stages of Infection of He Cells with Herpes Simplex Virus.** *J. Gene Microbiol.* 1960, Feb., v. 22, No. 1, 57–71, 2 figs

When HeLa cell monolayers were incubated w herpes simplex virus for 30 minutes at 37°C., wash and disrupted by ultrasonic vibration, only 3–7% of adsorbed virus was recovered. The amount of recov able virus decreased during the 2–4 hours after adso tion. Experiments in which herpes antiserum added to infected monolayers at different times show

at bound virus could be divided into 4 fractions: (A) out 63% of the virus, which was susceptible to anti-rum and which lost infectivity during the next 2 ours; (B) about 16%, which remained susceptible to tiserum and infective for at least 6 hours; (C) about %, which remained infective but was insusceptible to tiserum; and (D) about 19%, which became uninfec-ve and insusceptible to antiserum during the adsorp-on period. New virus arose from fractions A and D. omparison of the rate of loss of infectivity with the te of loss of susceptibility to antiserum suggested at adsorbed virus remained on the cells for a period thout undergoing a change of state, and that inacti-tion and insusceptibility to antiserum developed most together if not simultaneously.

This contrasts with the behaviour of herpes virus in AM cells [see above] where loss of infectivity seemed occur upon adsorption and where there was an terval before virus which had lost its infectivity ecame insusceptible to antiserum. In both cases anti-ody can prevent the development of adsorbed virus, ut it is not known whether it does so by preventing enetration of the virus or by interfering at some later tracellular stage in multiplication. *Janice Taverne*

NCONESCU, M. & ADERCA, I. Virusul herpetic în culturi de celule. III. Leziuni celulare produse de virusul herpetic pe culturi de celule amniotice si embrionare umane. [**Herpes Virus in Tissue Culture. III. Cell Lesions Produced by Herpes Virus in Cultures of Human Amnion and Embryo Cells**] *Studii si Cercetări Inframicrobiol.* 1959, v. 10, No. 4, 487–95, 6 figs. on 2 pls. [21 refs.] French summary.

A study has been made of the cytopathic effect pro-uced by the Bruxelles and 5433 strains of herpes virus cultures of human amnion and embryo fibroblast ells. The affected cells appeared rounded and of nequal size, and the cytopathic affect appeared in foci hich enlarged and later became confluent. Retraction f cells with the formation of cytoplasmic bridges were lso observed. In stained preparations the nuclei of ffected cells were enlarged, with margination of hromatin, lateral displacement of the nucleolus and xyphil inclusions. Giant cells with 5–70 centrally tuated nuclei were observed. *D. J. Bauer*

ASTRÉN, O. & RAUNIO, V. **The Virucidal Action of Ethylene Oxide. Experience gained of Methods employing Tissue Culture for Control of the Results.** *Ann. Med. Exper. et Biol. Fenniae.* Helsinki. 1960, v. 38, No. 1, 16–20.

A fixed amount of herpes simplex virus in tissue ulture medium was incubated with a mixture of 10% thylene oxide and 90% CO_2 at a pressure of 0·8 tmosphere, the dissolved gas was removed by centri-uging the virus suspension in a vacuum, and the virus vas inoculated into cultures of HeLa cells. After a ew days the cells were examined for cytopathic hanges. 2 hours' incubation was necessary at 45°C. and 7 hours at 20°C. before the virus lost all its infectivity. The evaporation process alone reduced virus infectivity but it was considered the best method of removing ethylene oxide, which itself destroys HeLa cells. Chemicals normally used to neutralize ethylene oxide could not be used because they either inactivated the virus or damaged the cells.

[It is a pity no quantitative experiments were done. No virus titrations are given, let alone inactivation curves, so that the activity of ethylene oxide in these conditions is difficult to estimate.] *Janice Taverne*

BERDINSKIKH, M. S. & KOSIAKOV, P. N. **The Action of Salivary Inhibitors on the Haemagglutinin of Mumps Virus.** *Problems of Virology.* London. 1958, v. 3, Nos. 5/6, 312–16. [Translated from Russian.]

Mumps virus in the form of infected allantoic fluid was mixed with serial 2-fold dilutions of saliva and left at room temperature for 45 minutes. 1 drop of a 5% suspension of chick red cells was then added, and the tubes were examined for the occurrence of haemagglutination after 1 hour at room temperature. Samples of saliva from 272 healthy persons were examined by this method, and in most cases were able to inhibit haemagglutination by the virus, in some cases in titres up to 512. The proportion of samples containing inhibitor increased with age, being 67% in 105 children aged 3–4 years and 90·4% in 83 adults, and there was also a concomitant rise in titre. The inhibitor was not destroyed by heating at 100° for 10 minutes. Samples of saliva from dogs, an animal which is not susceptible to mumps infection, contained a heat-stable inhibitor in titres up to 5120. *D. J. Bauer*

WERNER, G. H. SHARMA, R. & GOGOLSKI, L. **Hemagglutinin Inhibition with Ether-Treated Antigen as a more Sensitive Method to measure the Immunological Response to an Asian Influenza Virus Vaccine.** *Arch. f.d. gesamte Virusforschung.* 1960, v. 10, No. 1, 7–18. [23 refs.]

An inhibitor-insensitive egg-passage line of Asian influenza virus (A/Japan/305/57) was gently treated with ether. When treated virus was used in HI tests antibody rises were detected with sera of vaccinated subjects more frequently than they were when untreated virus was used. The authors consider that this change in reactivity may have been due to the release of complement-fixing antigen from the surface of the virus. *D. A. J. Tyrrell*

ROVNOVA, Z. I. **Preparation of Specific Influenza Antisera.** *Problems of Virology.* London. 1959, v. 4, No. 4, 79–84, 1 diagram. [24 refs.] [Translated from Russian.]

Rabbits were immunized by repeated injections of influenza viruses absorbed on chick red cells. The immune sera inhibited haemagglutination by viruses

which were not closely related antigenically to the strain used for immunization. It was thought that this inhibition was due to the presence of non-specific inhibitors and antibodies against minor antigenic components. The inhibitory activity was completely removed by absorbing the sera with a mixture of heterologous viruses adsorbed onto formalin-treated red cells and thus sera were obtained which in haemagglutination-inhibition tests were strictly monospecific for the virus with which the animal was immunized.

D. A. J. Tyrrell

ISAACS, A. & HITCHCOCK, Griselda. **Role of Interferon in Recovery from Virus Infections.** *Lancet.* 1960, July 9, 69–71, 2 figs. [13 refs.]

Mice were inoculated intranasally with various amounts of influenza A (PR8) virus—2 lethal and 2 non-lethal dose levels. At intervals groups of animals were killed. Sera were collected and tested for antibody and the lungs were collected and assayed for infectious virus by titration in eggs. Lung extracts were treated with acid to inactivate virus and placed on sheets of mouse embryo fibroblasts which were subsequently challenged with 50–100 plaque-forming units of encephalomyocarditis (EMC) virus. It was found that in addition to infectious virus mouse lungs contained at times a substance which could strongly inhibit the formation of plaques by EMC and had other properties much like those of chick interferon. [ISAACS and LINDENMANN, this *Bulletin,* 1957, v. 32, 1203.]

The peak of infectious virus concentration occurred 2 or 3 days after inoculation and the maximum interferon activity occurred between the second and fifth days, whereas the first serum antibody was not detected until over a week after infection, on the 11th or 14th day. The authors conclude that "relatively high concentrations of interferon are present in the lungs at the right place and the right time to account for the recovery from influenzal infection in mice." Interferon might play a part in the pathogenesis of natural infections with a number of viruses. *D. A. J. Tyrrell*

CHANY, C. & COOK, M. K., with the technical collaboration of F. ROBBE-FOSSAT & F. FOURNIER. Sur un facteur induit par le virus entrainant la formation de syncytium en culture cellulaire. [**A Virus-Induced Factor Provoking the Formation of Syncytia in Tissue Cultures**] *Ann. Inst. Pasteur.* 1960, June, v. 98, No. 6, 920–24, 2 figs.

The English summary appended to the paper is as follows:—

"Multiplication of *Myxovirus parainfluenzae* III (strain EA 102) during a one cycle growth is correlated with the formation of syncytium in tissue culture of KB cells. Large syncytial areas containing 30–40 nuclei are observed at the end of the eclipse period before appearance of infectious virus. Elaboration of an intracellular substance is suggested to explain this phenomenon. Lack of correlation with hemagglutination and viral hemolysins is discussed."

MAGRASSI, F., CAVALLINI, G. & MASSARANI, E. **Dr Active against Influenza Virus Infection in M** *Arch. f.d. gesamte Virusforschung.* 1960, v. No. 1, 19–30.

Experiments are described on two drugs, CV5 (4-biphenylylglyoxal bisulphite) and CV58903 (α-(α-(4-biphenylyl)-β-ethoxy-β-(4-carboxy-phenyl) am ethane). These drugs were given intranasally, sub taneously and by mouth and were tested for their ab to prevent the death of mice inoculated intranas with influenza A virus. They were most effec when administered before the virus and could pro animals given 100,000 LD50 of virus; they were ef tive when given up to 24 hours after a small dose virus (5 LD50). Less haemagglutinin was found in lungs of mice dying or surviving after treatment t in the lungs of similar but untreated mice. CV58 was less toxic than the other compound; a dose of mgm./kgm. protected nearly half the mice, but 8 or times this dose protected about the same proportion animals.

[There is little information about chronic toxicity the compounds but many other details will be found the original paper.] *D. A. J. Tyrre*

EMERY, J. B. & YORK, C. J. **Occurrence of a H adsorption Virus in Normal Monkey Tis Culture.** *Virology.* New York. 1960, May, v. No. 1, 313–15.

ALLISON, A. C., PEREIRA, H. G. & FARTHING, C. **Investigation of Adenovirus Antigens by A Gel Diffusion Techniques.** *Virology.* New Yo 1960, Mar., v. 10, No. 3, 316–28, 4 figs. [22 refs.]

HeLa cells grown in medium containing ^{32}P w infected with type 5 adenovirus, and 4 days later cells were washed and extracted with fluorocar (Arcton 63); the extract was then dialysed against 0· M *p*H 7·4 buffer and investigated for the presence antigens by gel diffusion precipitation combined v determinations of radioactivity. With homologous a serum 3 precipitation lines were obtained which co be identified as the A, B and C antigens [PEREIRA *et* this *Bulletin,* 1959, v. 34, 831] by immunoelectroph esis. The line due to the B antigen did not appear a preliminary treatment with proteolytic enzymes and not contain any incorporated radioactivity, and th fore did not contain nucleic acid; its equivalent meter was estimated to be 17 mμ. The A and C a gens were resistant to acid (*p*H 2·0) and to proteol enzymes and nucleases; however, they contained rac active phosphorus and stained with acridine orange, therefore presumably contained nucleoprotein. antigens differed in mobility and charge, and equivalent diameters of 8 and 10 mμ respectively. cell antigen with a molecular weight of 18,000 or was observed in some experiments. The various a gens could be separated from the infective virus pa cles by sucrose density gradient centrifugation.

D. J. Bau

ANDRES, K. H. & NIELSEN, G. Beobachtungen an Adenovirus (Typ 3)-infizierten HeLa-Zellkulturen nach Fixierung mit Kaliumpermanganat. [**Observations on HeLa Cell Cultures Infected with Adenovirus Type 3 After Fixation with Potassium Permanganate**] Reprinted from *Vierter Internationaler Kongress für Elektronenmikroskopie.* [**Fourth International Conference on Electron Microscopy**] Berlin, 10–17 September 1958. 1960, v. 2, 601–5, 3 figs. [12 refs.] Berlin. Göttingen. Heidelberg: Springer-Verlag.

PARSONS, R., BYNOE, M. L., PEREIRA, M. S. & TYRRELL, D. A. J. **Inoculation of Human Volunteers with Strains of Coe Virus Isolated in Britain.** *Brit. Med. J.* 1960, June 11, 1776–8.

Coe virus has been isolated on various tissue cultures from throat swabs of persons with mild febrile catarrh (LENNETTE *et al.*, this *Bulletin*, 1959, v. 34, 397; PEREIRA and PEREIRA, *ibid.*, 1960, v. 35, 90]. From these studies it was not certain whether Coe virus could be implicated as the aetiological agent of the observed illness or whether it might be a harmless resident of the normal upper respiratory tract.

In the present trial 7 human volunteers were given intranasal instillations of Coe virus obtained directly from man, and 4 persons received virus passed in human amnion tissue culture. All the volunteers, under segregated conditions, developed illnesses resembling the common cold, in 10 of the 11, Coe virus was recovered from throat swab material, and also from faeces in 7 instances. Serum neutralization tests on pre- and post-infective samples showed no evidence of rise in antibody titre in 8 of the 10 infected subjects; in fact 6 of these had no detectable antibody before or after infection. It is interesting to note that 2 of the persons becoming infected were found to have detectable antibody in moderate titre before virus challenge. Volunteers challenged with Coe virus which had been pre-incubated *in vitro* with specific antiserum failed to develop any obvious infection. Volunteers given control sterile inocula did not become ill, nor were Coe virus isolations made in any instance.

Derek Hobson

YERASIMIDES, T. G. **Isolation of a New Strain of Feline Pneumonitis Virus from a Domestic Cat.** *J. Infect. Dis.* 1960, May–June, v. 106, No. 3, 290–96, 7 figs. [22 refs.]

ROSEN, L. **Serologic Grouping of Reoviruses by Hemagglutination-Inhibition.** *Amer. J. Hyg.* 1960, Mar., v. 71, No. 2, 242–9. [15 refs.]

SABIN [this *Bulletin*, 1960, v. 35, 514] has recently described a new group of viruses termed reoviruses formerly known as ECHO 10. In this paper the classification of reoviruses into 3 serological types by haemagglutinin-inhibition tests is described. Previous workers had noted antigenic differences in strains of viruses now classified as reoviruses in neutralization tests, *e.g.* the separation of SV 12 and 59 by HULL *et al.* [*Ibid.*, 1958, v. 33, 1193]. By using the haemagglutinin-inhibition technique with human group O cells it was found that reoviruses isolated from children in the Junior Village in Washington fell into 3 groups. Specific sera could be made in guineapigs but 3 difficulties were found. The animals often had prior antibodies, developed heterospecific as well as specific antibodies and cross-infected other animals in close contact. Antibodies were also found in some monkeys, chimpanzees, horses, cattle, swine, cats and dogs as well as in human adults. Chicken and turkey sera were free of antibodies and satisfactory immune sera could be made in roosters by a course of intramuscular inoculations. The prototype strains selected were type 1 Lang, type 2 D5 and type 3 Abney. The simian virus SV 12 was type 1 and SV 59 was type 2. Two other simian members of the reovirus family, SV 4 and 28, were not typed. These viruses gave similar cytopathic effects and agglutinate rhesus monkey but not human red cells. However they could not be typed with reovirus antisera because of the presence of non-specific haemagglutinin inhibitors. Whereas children usually show a type specific response to reovirus infection, adults often have antibodies to more than 1 type—as do children who have experienced infection with more than 1 type of reovirus.

[The presence of reoviruses in uninoculated monkey kidney cells is another source of difficulty in the use of these cells for diagnostic virology. SV 59 (a type 2 strain) is stated not to have been isolated from normal monkey kidney cells—the original strain was recovered from the lung of a monkey with pneumonia (HULL *et al., loc cit.*). However, in the abstracter's laboratory SV 59 has several times been recovered from uninfected monkey kidney cultures used for safety tests of poliovaccine.] *A. J. Beale*

ROSEN, L. & ABINANTI, F. R. **Natural and Experimental Infection of Cattle with Human Types of Reoviruses.** *Amer. J. Hyg.* 1960, Mar., v. 71, No. 2, 250–57.

The 3 prototype strains of reoviruses were found to infect calves by the intranasal route as judged by virus isolation (except for type 1) and antibody response. Also a calf in contact with the 3 animals experimentally administered reoviruses became successively infected with the 3 strains of reovirus as a result of contact as judged by antibody response. Natural infection of cattle with reoviruses was suggested by the finding that the majority of breeding animals from 3 farms had haemagglutinin-inhibiting antibodies to at least 1 of the 3 types of reovirus. Also 5 reoviruses, all type 3, were isolated from the faeces of calves during the course of a survey of the enteric viruses of cattle. No illness was associated with either the natural or experimental reovirus infections. The type 3 reoviruses from cattle proved to be as good antigens as the human prototype 3 strain for detecting serological evidence of infection in human sera. *A. J. Beale*

ROSEN, L., HOVIS, Janet F., MASTROTA, F. M., BELL, J. A. & HUEBNER, R. J. **Observations on a Newly Recognized Virus (Abney) of the Reovirus Family.** *Amer. J. Hyg.* 1960, Mar., v. 71, No. 2, 258–65. [13 refs.]

The detailed studies of the Abney type 3 strain of reovirus that warrant its inclusion in this group are described. The cytopathic effect is typical although it appears more slowly than with types 1 or 2. Titres as high as 10^8 are obtained but titration tubes have to be held for 3 weeks and then subcultured to determine if virus has grown. The virus is ether resistant and the same size as other reoviruses. It is pathogenic for suckling mice by the intracerebral, intraperitoneal or subcutaneous routes, the chief lesions being in the liver. The viruses were isolated from children in an institution (Junior Village) in Washington. The first 3 were isolated during October 1955 to February 1956 when 26 out of 34 children in the nursery had serological evidence of reovirus type 3 infection. Later, in July to October 1957, there was another episode of reovirus type 3 infection in the nursery, 19 out of 68 children giving serological evidence of infection. In this outbreak 32% of the children had evidence of prior infection with the virus. During this second outbreak 8 isolations of virus were made from anal swabs and also from throat swabs of 2 of the children. 1 of the children was excreting virus on the day of admission and was therefore not considered to have been infected in the institution. It did not prove possible to identify a clinical syndrome associated with reovirus type 3 infection but for 6 of the children sufficiently well studied, from whom a virus was isolated, 5 suffered from a febrile illness within a 9-day period bracketing the virus isolation. It is at least possible that reovirus infection is manifested by fever, coryza and diarrhoea, but these symptoms are so common in this study population that this is no more than a possibility.

A. J. Beale

VERLINDE, J. D. Die experimentelle Poliomyelitis und ihre Bedeutung für das Studium der Pathogenese. **[Experimental Poliomyelitis and its Significance for the Study of the Pathogenesis]** *Ergebn. Mikrobiol. Immunitätsf.* 1960, v. 33, 49–96, 19 figs. [Numerous refs.]

In a detailed review of the laboratory aspects of poliomyelitis infection the author first describes the results obtained in the adaptation of the virus to various laboratory animals. Monkeys were extensively used in the classical work on the aetiology and pathogenesis of poliomyelitis. Attempts to adapt the virus to mice have been far less successful, great difficulty being experienced except with strains of type 2. Types 1 and 3 have been adapted to intraspinal passage in mice, and subsequently to intracerebral passage. The author deplores the confusion caused by the common use of the term murine poliomyelitis to designate the unrelated group of encephalomyocarditis viruses, and suggests that this term should be restricted to the mouse encephalomyelitis described by THEILER. The growth of pol myelitis virus in tissue culture was first observed long ago as 1913, but did not become a practical pos bility until 1949 [this *Bulletin*, 1949, v. 24, 534] with t development of new methods and assistance from t recently discovered antibiotics. The clinical aspe and the pathology of poliomyelitis infection in expe mental animals are next described, and the final secti of the review is devoted to a consideration of path genesis.

D. J. Bauer

FOGH, J. & STUART, D. C., Jr. **Intracellular Crystals Polioviruses in HeLa Cells.** *Virology.* New Yor 1960, May, v. 11, No. 1, 308–11, 2 figs.

ERCOLI, N., BOBALIK, G., STUBBS, R. K. & NUNE MONTIEL, O. **Action of Mucoproteins** *in vivo* a **in Tissue Culture on Poliomyelitis Virus.** *Pro Soc. Exper. Biol. & Med.* 1960, Apr., v. 103, No. 706–8.

Various mucoprotein fractions obtained from h gastric mucosa were investigated for their effect up type 2 poliomyelitis virus infection in monkey kidn cells and in mice. It was found that they had no effe upon the growth of poliovirus in monkey kidney ce but that they exerted a protective effect upon mi infected with the Lansing strain of type 2 poliovir intracerebrally. In most of the experiments the mi were infected on a Friday and the treatment was start on the following Monday. Treatment was given eith by subcutaneous inoculation or orally. The doses giv were in the order of 10–40 mgm. per kgm. and usual 10 treatments were given in the animals treated aft infection and 1 or 2 doses in the few experiments whe the animals were treated prior to challenge. The diffe ence between the doses and the preparations used w not marked. In all, 59 out of the 205 treated anima survived for 60 days whereas only 1 out of 60 contr animals survived for this length of time. 20 mgm. p kgm. of gamma globulin given orally in 10 doses result in the survival of 2 out of 15 animals.

A. J. Beale

HERTENSTEIN, Charlotte. Herstellung eines komplemen bindenden Antigens für die Poliomyelitisdiagnos **[Preparation of a Complement Fixing Antige for Diagnosis of Poliomyelitis]** *Zent. f. Bak* I. Abt. Orig. 1960, v. 178, No. 4, 413–20. 16 refs

The author has developed a poliomyelitis compl ment-fixing antigen of high activity which can be pr duced cheaply without ultracentrifugation or the use c complex equipment. Confluent cultures of HeLa cel are treated with enough poliomyelitis virus to infe every cell, and after 2 hours the cells are washe removed from the glass with trypsin, washed agai resuspended in 1/10 of the original volume of nutrie fluid and kept at 37°C. for 24 hours with continue stirring and frequent adjustment of the *p*H to neutralit The medium containing virus and cell débris is the

emoved and mixed with an equal volume of 1:2-ifluorotetrachloroethane adjusted to a specific gravity f 1·3 with toluene [this *Bulletin*, 1957, v. 32, 1205]. he phases are separated by centrifuging and the super-atant layer is used as antigen. The infectivity and ntigenic strength were not affected by 5 successive eatments with fluorocarbon. In the typing of 52 uman sera containing antibody, 23 (44·2%) gave a ifferent result when the test was repeated with antigen eated for 1 hour at 56°C., and the use of inactivated ntigen is therefore not recommended. *D. J. Bauer*

ROSSOWICZ, N., MERCADO, A. & GOLDBLUM, N. **A Simple Method for Concentration of Live and Formaldehyde-Inactivated Poliovirus.** *Proc. Soc. Exper. Biol. & Med.* 1960, Apr., v. 103, No. 4, 872–4. [12 refs.]

The authors describe a method for concentrating ving or formalin-inactivated poliovirus preparations hich they believe could be adapted for large scale oncentration in the preparation of killed poliovaccine. n this way they believe it would be possible to improve ne potency of killed poliovaccine. The method depends pon the use of divalent cations, Ca++, Ba++, Mn++ nd Co++. Most of their work has been done with obalt chloride. The preparation is adjusted to an lkaline *p*H, around *p*H 9, and then cobalt chloride is dded with continuous stirring to a final concentration f 1 mgm. of Co.++ per ml. of vaccine. A flocculent recipitate appears almost immediately and usually ettles out completely in 1 hour at 4°C. Alternatively ne deposit can be removed by centrifugation. The recipitate is then dissolved in a small quantity of IcIlvaine's buffer at *p*H 3·0 and dialysed for several ours against 100 volumes of the same buffer. In this ay up to a 1,000-fold concentrations have been chieved with 99% recovery as measured by infectivity r for formalin-inactivated virus by means of potency etermined by the GARD'S antigen extinction method in uineapigs [this *Bulletin*, 1956, v. 31, 757]. The method or formalin-inactivated virus is essentially the same as or living virus except that the *p*H has to be slightly igher, 9 to 9·3, and the precipitate is taken up in a tric acid phosphate buffer of *p*H 4·2 to 4·4.

A. J. Beale

LIVISATOS, G. P. & EDIPIDIS, T., with the technical assistance of M. VARDALA & G. PAGOULATOS. Über die Immunisierung von Zellen in Zellkulturen. II. Mitteilung. [**The Immunization of Cells in Tissue Cultures. 2nd Communication**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1960, Apr., v. 119, No. 4, 344–64, 9 figs. [10 refs.]

In a continuation of previous work [this *Bulletin*, 960, v. 35, 517] the authors have made a further study f the apparent immunization of cultures of human mnion cells treated with 3 commercial inactivated oliomyelitis vaccines. Tube cultures 4 days old were cubated with various dilutions of vaccine in nutrient uid in order to select a dose of vaccine which would not produce visible damage to the cells. Cultures exposed to the selected doses for 4 days were then challenged with 100 and 200 TCD50 of the Mahoney, MEF1 and Saukett strains of poliomyelitis virus, and in most cases the cells were found to be resistent to infection, as judged by the absence or reduction of the cytopathic effect. Supernatant fluid removed from cultures exposed to the action of the vaccine neutralized 100 TCD50 of the 3 types of poliomyelitis virus to a titre of 16–32. Small amounts of virus could be detected in the supernatant fluid of cultures treated with vaccine which had survived the challenge infection.

The cultures were not resistant to challenge when the period of contact with the vaccine was reduced to 1–24 hours, and it was therefore concluded that the protective effect of the vaccine was not due to interference by the inactivated virus. *D. J. Bauer*

See also p. 958, RYZOV & ŠTANNIKOV, [**Disinfection of Water Infected with Poliomyelitis Virus**].

GRIST, N. R. **Isolation of Coxsackie A7 Virus in Scotland.** *Lancet.* 1960, May 14, 1054–5.

This preliminary note describes the isolation of 37 viruses by inoculation of faecal extracts from patients suspected of having poliomyelitis (either paralytic or non-paralytic) into suckling mice during 1959. These extracts failed to yield viruses in monkey kidney cells. 2 of the strains were identified histologically as Coxsackie B viruses and one was successfully typed as Coxsackie B5. 35 strains were histologically Coxsackie A, and 2 additional strains of Coxsackie A isolated in earlier years were examined. 33 of these 37 strains have been identified serologically as Coxsackie A7 by means of antisera against the prototype virus and against the Russian AB IV virus (at first thought to be type 4 poliovirus [this *Bulletin*, 1957, v. 32, 907]). The Scottish Coxsackie A7 viruses may be related to Coxsackie A14 since a serum prepared against one strain (1034) caused partial inhibition of Coxsackie A14 virus.

It was found that Coxsackie A7 virus agglutinates fowl red cells positive for vaccinia and that this agglutination is specifically inhibited by Coxsackie A7 antisera. Unfortunately non-specific inhibitors in human sera have prevented the exploitation of this test for diagnostic or epidemiological purposes. The viruses were also typed by complement-fixation tests. As yet not all the viruses have been examined by all 3 techniques, but there is good agreement between tests. Thus 32 were typed by haemagglutination inhibition and 27 of these by complement-fixation. Also 16 have been typed by neutralization tests in suckling mice including the 5 not successfully typed by complement-fixation. One strain caused paralysis in adult merions but not mice. The Scottish Coxsackie A7 viruses have not been adapted to tissue culture. 7 of the 33 patients from whom the virus was isolated were paralysed and 1 died. 4 Coxsackie strains remain unidentified. The full clinical and epidemiological details are promised later. *A. J. Beale*

DUCA, E., TOMESCU, E., DUCA, M. & BOTAN, A. Imunizarea soarecelui alb cu virusuri Coxsackie în vederea obtinerii de ser hiperimun. [**The Immunization of White Mice with Coxsackie Viruses for the Preparation of Hyperimmune Sera**] *Studii si Cercetări Inframicrobiol.* 1959, v. 10, No. 4, 459–70, 1 fig. [13 refs.] French summary.

Adult white mice have been found suitable for the preparation of neutralizing antisera to Coxsackie viruses types A1–10 and B1–3. Immunization was carried out by the intraperitoneal injection of a 10% suspension of infected carcass in 5 doses of 0·5 cc. at intervals of 4 days. The rate of formation of neutralizing antibody was followed by bleeding the animals at intervals from the retro-orbital plexus, a procedure which enables 0·5–0·75 cc. of blood to be obtained repeatedly from each animal. In experiments with type A10 virus neutralizing antibody attained a titre of 10^5–10^6 30 days after the beginning of immunization, and somewhat higher titres were obtained with types A2, A4, A8 and A9. Guineapigs gave titres which were almost as high, but the titres attained in rabbits were more than 1 log unit lower. Immunization of adult mice by the subcutaneous, intramuscular or oral routes was less effective. *D. J. Bauer*

SOMMERVILLE, R. G. **The Growth Cycle of ECHO Viruses in Tissue Culture. II. Rate of Adsorption of ECHO Virus Types 1, 2, 7 and 11 to Monolayer Cultures of Monkey Kidney Cells.** *Brit. J. Exper. Path.* 1960, June, v. 41, No. 3, 222–8, 3 figs.

The rate of adsorption of ECHO viruses types 1, 2, 7 and 11 to monkey kidney cells was determined by 3 methods. (1) Residual unadsorbed virus was titrated after various periods of contact with cells at 37°C. (2) The number of microplaques developing in a culture after various times of exposure was determined. (3) In similar experiments, with a massive dose of virus, the time taken to destroy the culture was determined after varying periods of contact. It was found that the viruses were adsorbed at different rates in the following declining order: ECHO 7, 1, 11 and 2. ECHO 2 was adsorbed much less quickly than the other viruses. The times taken for 50% adsorption by the first 2 methods were for type 7, 9 and 4·5 minutes; type 1, 12 and 15 minutes; type 11, 12 and 16 minutes, and type 2, 90 and 20 minutes respectively. *A. J. Beale*

SOMMERVILLE, R. G. **Interference Phenomena between ECHO Virus Types 1, 2, 7 and 11.** *Arch. f.d. gesamte Virusforschung.* 1960, v. 10, No. 1, 1–6.

Monkey kidney cells uniformly infected with ECHO 1, 2, 7 or 11 (4 TCD50 per cell) were found to give infectivity titres 2 or 3 $\log_{10}$ units lower for any of the other viruses added 1–5 hours later, also in a dose of 4 TCD50 per cell. These experiments were confined to 5 hours in order to be within 1 growth cycle of ECHO viruses. However, it is noted that LYCKE [*Bulletin,* 1959, v. 34, 98] found a much greater in ference between enteroviruses when challenge delayed for 18–22 hours. [It is also found in influenza virus system that optimal interference ta 24 hours to became established, at least with inactiva virus [see FAZEKAS DE ST. GROTH: *et al., ibid,* 1953, v. 225].] *A. J. Beal*

SOMMERVILLE, R. G. **Some Factors Affecting Plac Formation by ECHO Virus Type 2 in Monk Kidney Cells.** *Brit. J. Exper. Path.* 1960, Ju v. 41, No. 3, 229–33.

HSIUNG and MELNICK found that one group of EC viruses, comprising types 2, 3, 5 and 6, did not prod plaques on monkey kidney cells. Sommerville, in cor spondence (*Virology,* 1959, v. 9, 701), found t one member of this group, ECHO 2, produced mic plaques in test-tube cultures of monkey kidney c with a fluid overlay medium. An investigation of differences between the method of Hsiung and Mel [this *Bulletin,* 1957, v. 32, 1204] and that of Somm ville was therefore carried out. There were only f differences in the medium used in the two metho First, Hsiung and Melnick used slightly more sodi bicarbonate. In experiments varying the amount bicarbonate it was found that optimal numbers plaques were produced with 0·176 and 0·352% sodium bicarbonate in the overlay medium. Simila the addition of agar did not inhibit the production microplaques nor did the omission of phenol red. was found that the neutral red was the component t supressed the formation of plaques in Hsiung Melnick's experiments. Thus, the numbers of plaq were reduced even with 0·25 neutral red, and plaques, or only occasional plaques, appeared w concentrations greater than 1·5%. *A. J. Beal*

SANDERS, F. K. **Role of Infective Nucleic Acid the Production of Encephalomyocarditis Vir** *Nature.* 1960, Mar. 19, v. 185, 802–4, 5 figs. refs.]

A study has been made of the rate of production infective ribonucleic acid in Krebs 2 carcinoma c infected *in vitro* with encephalomyocarditis virus. cells were continually agitated and, at intervals af infection, samples were extracted with phenol; the inf tivity of the ribonucleic acid obtained was determi by titration in mice. In cells infected with a multi city of 3, infective ribonucleic acid could be found minutes after infection, and the amount then increa steadily to attain a maximum titre of 10^5 mouse II per cc. after 5 hours. Incubation of the cells, fo hour before infection; with euflavine in concentrati of 0·1–10 μgm. per cc. inhibited the production infective virus and ribonucleic acid. Euflavine also an inhibitory effect when added to the cells up to hours after infection; when added up to 1½ hours a

nfection the production of ribonucleic acid was inhibited, but when added after 4 hours ribonucleic acid was formed but the production of haemagglutinin and nfective virus was still reduced. Inhibition could also be produced by the addition of 5-fluorouracil up to 1 hour after infection. *D. J. Bauer*

HENDERSON, J. R. & TAYLOR, R. M. **Propagation of Certain Arthropod-Borne Viruses in Avian and Primate Cell Cultures.** *J. Immunology.* 1960, June, v. 84, No. 6, 590–98, 5 figs.

Representative arborviruses of groups A, B and C were tested in fluid medium cultures for cytopathic effect (CPE), and in overlaid cultures for plaque production (PL), by using monolayer cultures of trypsinized chick embryo, Pekin duck kidney and rhesus monkey kidney. In group A, eastern, western and Venezuelan equine encephalitis, Sindbis and Semliki viruses caused both CPE and PL in chick embryo cultures while Mayaro and Middelburg viruses caused only PL, and Chikungunya neither. Chikungunya did not multiply in chick embryo tissue. All the group A viruses tested caused PL in Pekin duck kidney, and all of them except Sindbis and Middelburg, CPE. All of them caused PL in monkey kidney but no CPE was observed with Sindbis, Semliki, Mayaro or Middelburg. Titrations by CPE gave about the same titres as intracerebral inoculation of infant mice but titrations by PL were generally 10-fold higher or more. There were no differences between 3 passage levels of eastern equine virus.

None of the group B viruses tested showed CPE or PL on chick embryo cultures. In Pekin duck kidney, West Nile (3 passage levels), Zika, Uganda S and Ntaya caused CPE but not Japanese encephalitis, St. Louis encephalitis, Bussuquara or Ilheus: all of them, however, caused PL except Ilheus, although the plaques formed by Ntaya were difficult to demonstrate. West Nile, Japanese encephalitis and St. Louis viruses were shown to multiply in Pekin duck kidney reaching about 10^6 LD50 by titration in suckling mice. Only Ilheus caused CPE in monkey kidney and it also caused PL; plaques difficult to demonstrate were seen also with Zika but not the others.

None of the group C viruses showed CPE or PL in chick embryo or in Pekin duck kidney (except plaques difficult to demonstrate with Marituba). All, however, caused PL in monkey kidney although Oriboca and Murutucu caused only inconsistent CPE, and the remainder (Caraparu, Marituba, Apeu) none. Caraparu and Apeu gave titres based on PL about 3 log lower than infant mouse titration but the other 3 gave higher PL titres.

Regardless of the cell system, group A plaques generally appeared in 2–4 days, group B in 4–6 days and group C in 6–7days. Some viruses produced plaques without complete cellular degeneration within the plaque. Overlaid chick embryo and Pekin duck kidney cultures were incubated at 30–32°C. since at 35–37°C. the cultures often degenerated before plaques could form. Cultures were incubated in the dark to avoid cell damage from neutral red. *C. E. Gordon Smith*

KAVERIN, N. V. **A Study of Western Equine Encephalomyelitis Virus. I. A Comparative Study of Titration and Neutralization of the Virus in Tissue Cultures and in Animals.** *Problems of Virology.* London. 1959, v. 4, No. 4, 30–34, 2 figs. [Translated from Russian.]

A strain of western equine virus in high mouse passage was used. The titre of the virus in mice and chick embryo tissue cultures was 10^{-7} to 10^{-8}. In tissue culture, cytopathic effects appeared after 2–3 days and were well marked. Fibroblasts from 9-day embryos were about 100 times more sensitive than those of 11-day embryos. No significant difference was found in sensitivity between chick embryo cultures (9-day embryos) and mice inoculated intracerebrally. When rat and rabbit antisera were tested in neutralization tests in the 2 systems, 0·5–>3·5 log higher indices were obtained in tissue culture than in mice. A linear relation was found between the log neutralizing indices in tissue culture and those in mice with a regression coefficient of $0{\cdot}87 \pm 0{\cdot}14$. *C. E. Gordon Smith*

HEARN, H. J., Jr. **A Variant of Venezuelan Equine Encephalomyelitis Virus attenuated for Mice and Monkeys.** *J. Immunology.* 1960, June, v. 84, No. 6, 626–9.

A variant (CILV–8) was derived from the PES strain of Venezuelan equine virus which was isolated from a donkey and had undergone 13 chick-embryo passages. The variant was derived by 8 serial passages in L cells of virus isolated from cells surviving cytopathic changes in the first passage. PES titred 10·5 log LD50/ml. by intracerebral and 9·0 log by intraperitoneal inoculation of mice: CILV–8 titred 8·2 log intracerebrally but only 0·6 log intraperitoneally. However, mice inoculated intraperitoneally with 100 intracerebral LD50 of CILV–8 were protected against 10^6 LD50 of PES inoculated intracerebrally. In monkeys inoculated intracerebrally, both strains caused fever but the viraemia with CILV–8 (1·4–2·2 log LD50/ml.) was much lower than with PES (5·6–7·1 log LD50/ml.). Both strains caused irritability but PES caused convulsions in 5 of 13, paralysis in 2 of 13 and death in 2 of 13, compared with none of these in 5 monkeys with CILV–8. Fever and viraemia were the only effects when monkeys were given 8·2 log LD50 of CILV–8 intramuscularly but they were immunized without either of these by doses of 3·2–5·2 log LD50. Monkeys which had been immunized showed no fever, viraemia or symptoms when challenged with 5·3 log LD50 of virulent virus (CES strain) intracerebrally—all the control monkeys had fever and viraemia and died.

This variant might be suitable as a human vaccine, but consideration must be given to the potential carcinogenic nature of continuous cell lines in one of which this strain is propagated. *C. E. Gordon Smith*

SLEPUSHKIN, A. N. **An Epidemiological Study of Laboratory Infections with Venezuelan Equine Encephalomyelitis.** *Problems of Virology.* London. 1959, v. 4, No. 3, 54–8. [17 refs.] [Translated from Russian.]

9 ampoules of 0·5 ml. of 5% freeze-dried mouse brain infected with Venezuelan equine virus were accidentally broken on a landing in the laboratory on 31st May; 9 other ampoules were damaged or cracked. The site of the accident was disinfected with phenol, alchohol and lysol. Before this, however, a doorway had been repeatedly opened, releasing dust to other parts of the building. The first cases among the staff started 28–33 hours after the accident, 15 persons falling ill on 1st June. All of these had had close contact with the accident site. 7 more persons fell sick on 2nd June. Persons from the floors above and below the accident were affected, indicating the probable importance of dust spread. 2 more persons became ill on the 4th June. Most of these illnesses were shown to be due to Venezuelan virus by serology or virus isolation [see below]. Members of the staff falling ill between 4 and 11th June were tested but no further cases found. No secondary cases occurred among family contacts, including nursing infants and children of the patients.

C. E. Gordon Smith

SHUBLADZE, A. K., GAIDMOVICH, S. Y. & GAVRILOV, V. I. **A Virological Study of Laboratory Infections with Venezuelan Equine Encephalomyelitis.** *Problems of Virology.* London. 1959, v. 4, No. 3, 48–54, 1 fig. [12 refs.] [Translated from Russian.]

This gives an account of the virological study of the patients described by SLEPUSHKIN [see above]. Blood and throat-washings collected 2–5 days after onset, while all except 1 patient were febrile, were inoculated intracerebrally into mice and onto the chorio-allantoic membrane of chick embryos 7–8 days old. Virus was isolated from 8 of 16 patients: from blood in 2, both on the 5th day, from throat washings in 6, 2–6 days after onset. In 23 samples inoculated into both mice and chick embryos, 6 strains were isolated in mice and only 1 in chick embryos. Sera collected 3–7 days after onset, 12–14 days after onset and 25–40 days after onset were tested for neutralizing antibody by an intracerebral mouse test. 3 of 13 sera taken in the first week had significant antibody but rises of titre to indices of over 10,000 in most cases were demonstrated in all 20 patients. There was no relationship between severity of disease and degree of antibody response. The virus caused lassitude, fever and death in 2–3 days in guineapigs [?inoculation route]. Rabbits had fever 24 hours after inoculation and died after 5 days [?route]. White rats became sick and paralysed after 5–7 days and died after 6–9 days.

C. E. Gordon Smith

SOKOLOV, N. N. **Biological Properties of the Virus Japanese B Encephalitis with Varying Degrees Adaptation to White Mice.** *Problems of Virolog* London. 1959, v. 4, No. 3, 62–6, 4 figs. [Translat from Russian.]

3 virus strains isolated from fatal cases of Japane encephalitis in the Kwantung peninsula were compar in mice after 4–7 passages and after 50–60 passag With the low passages the incubation period after intr cerebral inoculation varied with dose, but death ensu within 24 hours of the onset of symptoms. For 10– hours after infection little virus could be detected the brain; after 24 hours the titre rose rapidly to maximum of 8·25—8·5 log LD50 after 72–84 hours. Wi small doses the infection curve lagged by 24–48 hou With high passage virus the clinical disease w shortened to 8–14 hours; multiplication was also mo rapid. The low-passage viruses were pathogenic f mice by subcutaneous inoculation but the infectivi was about 5 log lower than by the intracerebral rou and the incubation period was prolonged up to 31– days. In such mice, little virus could be detected in t brains for 2–3 days or more after infection and maxim titres were not reached until 10 to 18 days after infe tion. With high passage strains given subcutaneousl long incubation periods (29–53 days) were also seen.

C. E. Gordon Smith

BENDA, R., DANES, L. & FUCHSOVÁ, Mirja. Citlivost op druhu *Mac. cynomolgus* a *Mac. rhesus* k vi klíštové encefalitidy. **[Sensitivity of the Monke *Macreus cynomolgus* and *M. rhesus* to the Viru of Tick Borne Encephalitis]** *Československ. Epidemio Mikrobiol., Imunol.* Prague. 1960, v. 9, No. 1–11, 13 graphs & 4 figs. on 2 pls. [25 refs English summary.

2 cynomolgus monkeys infected intracerebrally wi 10^6 mouse LD50 of tick-borne encephalitis vir developed a febrile illness with viraemia and progre sive paralysis and died after 10 and 11 days. 4 monke given 50 and 500 LD50 of virus both intracerebral and intraperitoneally survived without developing sig of illness; viraemia and the development of neutralizi antibody were observed in the 2 animals given t higher dose. In further experiments in which small doses of virus were given no evidence of infection cou be obtained. The infective dose of the virus for t cynomolgus monkey was therefore about 200 mou LD50, and in animals given this dose by both rout simultaneously the development of viraemia and t formation of neutralizing antibody could be inhibit by treatment with cortisone. Rhesus monkeys were le susceptible to the virus, the infective dose being arou 20,000 mouse LD50. The results indicate that monke are not sensitive enough to be used for the safety testi of tick-borne encephalitis vaccine. *D. J. Bauer*

VILCEK, J. **An Interferon-Like Substance released from Tick-Borne Encephalitis Virus-Infected Chick Embryo Fibroblast Cells.** [Correspondence.] *Nature.* 1960, July 2, v. 187, 73–4, 1 fig.

The Hypr strain of tick-borne encephalitis virus and western equine encephalitis virus were grown in chick embryo fibroblast cultures. Cultures were infected with Hypr virus and the medium harvested at intervals; fluids from 48 hours after inoculation were found to interfere with the growth of western equine virus. Inhibition of plaque-formation was also demonstrated. Treatment of the interfering fluids with immune gamma globulin did not affect their potency and the active material seems to be interferon. Active fluids had no effect on incidence or survival time when they were mixed with western equine virus before it was inoculated intracerebrally into mice. *C. E. Gordon Smith*

LEVKOVITSCH, E. N. & SASSUCHINA, G. D. Kulturelle Gewebevakzinen gegen Zeckenencephalitis. [**Vaccine against Tick-Borne Encephalitis produced in Tissue Cultures**] *Zent. f. Bakt.* I. Abt. Orig. 1960, v. 178, No. 4, 421–6.

Cultures of trypsinized muscle tissue of 9–10-day chick embryos have been found suitable for growing the Pan strain of tick-borne encephalitis virus for the purpose of preparing a vaccine. Virus in tissue culture fluid harvested at the time of maximum titre was completely inactivated by 1:2000 formaldehyde after 12 hours at 37°C. and 48 hours at 20°C. The inactivated virus produced only a low resistance index when administered to mice with subsequent intraperitoneal challenge, but the antigenicity could be increased 50–100-fold if the inactivated virus was adsorbed onto aluminium hydroxide. No local or general reactions were observed in 20 volunteers inoculated subcutaneously with the adsorbed inactivated vaccine.

D. J. Bauer

PANTHIER, R. & HANNOUN, C. Virulence pour l'embryon de poulet du virus vaccin amaril. [**Virulence of Yellow Fever Vaccine for Chick Embryos**] *Bull. Soc. Path. Exot.* 1960, Jan.–Feb., v. 53, No. 1, 100–105.

[An abstract of this paper appeared in the *Tropical Diseases Bulletin*, 1960, v. 57, 1048.]

BRICEÑO ROSSI, A. L., in collaboration with R. ISAAC DIAZ & Helena SEGURA. Nota previa al estudio de los virus Arbor en Venezuela. [**Preliminary Note on the Study of Arborviruses in Venezuela**] *Gac. Méd. de Caracas.* 1960, Jan.–Mar., v. 68, Nos. 1/3, 45–50.

[An abstract of this paper appeared in the *Tropical Diseases Bulletin*, 1960, v. 57, 1048.]

SCHWARZ, A. J. F. & ZIRBEL, L. W. **Propagation of Measles Virus in Non-Primate Tissue Culture. I. Propagation in Bovine Kidney Tissue Culture.** *Proc. Soc. Exper. Biol. & Med.* 1959, Dec., v. 102, No. 3, 711–14, 1 fig.

A line of the Edmonston strain of measles virus which had previously undergone 24 passages in human kidney and 27 passages in human amnion cells has now been successfully passaged in cultures of the trypsinized cortical cells of the kidneys of 8–9 months bovine foetuses. The medium was changed every 3–4 days, and a cytopathic effect was first observed after 70 days; virus could be found in the culture fluid after 14 days, however, and remained at a titre of 1·8–2·5 log units per cc. for 81 days in spite of 11 changes of medium. In another passage line harvested and subcultured every 14 days a cytopathic effect eventually appeared after 5–14 days, and somewhat higher virus titres were attained. In the affected cultures the multinucleate giant cells with eosinophilic intranuclear inclusions characteristic of measles could be found. The identity of the passaged virus was confirmed by neutralization tests with specific immune serum. The virus produced no signs of illness when injected intramuscularly into 5 cynomolgus monkeys, but it could be isolated subsequently from the blood and throat, and the animals developed measles neutralizing and complement-fixing antibodies. *D. J. Bauer*

RAPP, F., GORDON, I. & BAKER, R. F. **Observations of Measles Virus Infection of Cultured Human Cells. I. A Study of Development and Spread of Virus Antigen by means of Immunofluorescence.** *J. Biophys. & Biochem., Cytol.* New York. 1960, Feb., v. 7, No. 1, 43–8, 20 figs. on 5 pls. [19 refs.]

The development and spread of the Edmonston strain of measles virus in cultures of human amnion and Hep-2 cells have been studied by means of the indirect fluorescent antibody technique. In human amnion cells virus antigen could not be detected until the 4th day after infection, when specific fluorescence could be seen in the nucleus, localized in a few small round homogeneous bodies, and also in the cytoplasm, where it occupied a perinuclear situation. In the following days the fluorescence became generalized and cytopathic changes appeared. In Hep-2 cells specific fluorescence appeared 12 hours after infection, in the form of coccoid bodies usually less than 1 μ in diameter situated around the nucleus. Intranuclear inclusions were occasionally seen. After 18 hours the foci of fluorescence had spread to adjacent cells, and the infected cells were beginning to form fusiform processes, many of which contained virus antigen. The changes subsequently became more marked and involved most of the cell sheet. Specific fluorescence was often observed in the nucleoli. The spread of the infection through the cell sheet was not prevented by the addition of specific antibody to the culture fluid. *D. J. Bauer*

RAPP, F. **Observations of Measles Virus Infection of Human Cells. III. Correlation of Properties of Clones of H.Ep.-2 Cells with their Susceptibility to Infection.** *Virology.* New York. 1960, Jan., v. 10, No. 1, 86–96, 5 figs. [11 refs.]

By means of immunofluorescence microscopy the author has previously found [see RAPP *et al.*, above] that the individual cells of a Hep-2 cell culture varied in the amount of measles virus which they contained, and in the present work clones of Hep-2 cells have been isolated and their ability to support the multiplication of the Edmonston strain of measles virus has been investigated. The cells were trypsinized and deposited on a plate in such a dilution that they were well separated and were grown for 14 days in an atmosphere of 5% carbon dioxide in a medium consisting of double strength Eagle medium with 20% human or 10% horse serum, which was changed every 2–3 days. The colonies of cells which grew up were resuspended and replated, and the cloning procedure was finally repeated for the 3rd time. 5 clones were studied, which showed differences in morphology when examined under the phase-contrast microscope. On infection with 100 TCD50 of virus 2 clones (C-3 and F-3) produced much more virus than the others. The original strain of Hep-2 cells required 6–7 times more virus to initiate infection than the C-3 clone. The C-3 clone was the only one in which parasynchronous division could be induced by chilling by the method of STOKER and NEWTON [*Ibid.*, 1959, v. 34, 1298]. *D. J. Bauer*

DEWITT, C. W. & NOOK, Mary A. **Studies on Measles Virus in Tissue Culture. III. The Antigenicity of Live and Killed Measles Virus in a Nonsusceptible Host.** *J. Immunology.* 1960, Feb., v. 84, No. 2, 194–202, 3 figs. [19 refs.]

Guineapigs, rabbits and chickens, which are insusceptible to infection with measles virus, all responded with the production of specific neutralizing antibody after intradermal or intravenous infection with the P-2 strain of measles virus. Injection by the intraperitoneal route was also effective in evoking antibody production in rabbits and guineapigs. Titres of 512–2048 were attained in guineapigs given 4 intraperitoneal injections of measles virus over a period of 17 days, and a primary and secondary response could be observed. Vir inactivated by heating at 45°C. for 64 hours or l exposure to electrons still retained full antigenicity. Th effect of exposure to various concentrations formaldehyde was also studied. *D. J. Bauer*

PISKAREVA, N. A., PISAREVA, N. A. & IVANOV, N. **Development of a Method for the Inactivation Rabies Vaccine with Ultra-Violet Radiatio I. The Influence of Different Conditions of Ultr Violet Irradiation on the Infectivity and Im munological Properties of Fixed Rabies Viru** *Problems of Virology.* London. 1959, v. 4, No. 34–8, 1 fig. [Translated from Russian.]

[An abstract of this paper appeared in the *Tropic Diseases Bulletin*, 1960, v. 57, 1050.]

KAPLAN, M. M., FORSEK, Z. & KOPROWSKI, H. **Demo stration of Rabies Virus in Tissue Culture wi Fluorescent Antibody Technique.** *Bull. Wor Health Organization.* Geneva. 1960, v. 22, No 3/4, 434–5, 1 fig.

[An abstract of this paper appeared in the *Tropic Diseases Bulletin*, 1960, v. 57, 897.]

NIKOLITSCH, M. Das Virus der Fledermäuse und d Encephalomyelitis des Menschen. [**The Virus Bats and Encephalomyelitis of Man**] *Arch. f. Hy u. Bakt.* 1959, Dec., v. 143, No. 8, 607–18. [refs.]

[An abstract of this paper appeared in the *Tropic Diseases Bulletin*, 1960, v. 57, 896.]

KAPLAN, M. M., WECKER, E., FORSEK, Z. & KO ROWSKI, H. **An Indicator Plaque-Formi System for Demonstration of Interference by No Cytocidal Strains of Rabies Virus.** [Correspo dence.] *Nature.* 1960, June 4, v. 186, 821–2.

[An abstract of this paper appeared in the *Tropic Diseases Bulletin*, 1960, v. 57, 1049.]

IMMUNITY

MURAKAMI, S.; OKA, Y.; MATSUURA, Y.; YOSHIOKA, T. **Studies on Prevention of Infection (I). Antigenic Capacity of Enzymatically Active Fractions isolated from Tubercle Bacilli against Tuberculosis of Mouse** [MURAKAMI, OKA, MATSUURA & YOSHIOKA]. *Acta Med. Okayama.* 1959, Apr., v. 13, No. 1, 1–14, 4 figs. [21 refs.] **(II) The Enzymologic Traits and Protective Ability of the Fractions obtained from *Salm. typhi* by High Speed Centrifugation** [MURAKAMI, YOSHIOKA, OKA & MATSUURA]. *Ibid.*, 15–26. [13 refs.]

I. Fractions from the virulent H37Rv and t avirulent H37Ra were examined for their ability immunize mice against experimental tuberculosis. T organisms for fractionation were grown in Sauto medium for 16 days and washed repeatedly. 13 gm. wet cells were ground with sand in a mortar. T ground paste was suspended in buffer and centrifug for 30 minutes at 4,000 r.p.m. The sediment was d carded and the supernatant was centrifuged for minutes at 1,500 r.p.m. A sediment (R_1) was remov and the supernatant subjected to centrifuging or

ore, this time for 60 minutes at 40,000 r.p.m. The pernatant (S_1) and the sediment (R_2) were retained. The protective effect of S_1 and the sediments R_1 and $_2$ were examined by injecting them intraperitoneally to mice which were challenged intravenously with 37Rv one month later. Only the fraction R_2, whether erived from H37Rv or from H37Ra, gave protection judged by survival. Histological examination showed at contol mice died within 25 days with gross seous lesions whereas protected animals killed after e 33rd day had only mild proliferative lesions in the scera.

The fractions R_2 and S_1 were examined for oxygen ptake when added to substrates of the tricarboxylic id cycle. Conventional Warburg techniques were sed. S_1 possessed enzymatic activity against various bstrates but R_2 " specifically " oxidized only lactate nd succinate.

The authors are now attempting to determine the emical nature of R_2 and its location within the acterial cell.

II. The methods used to study ultracentrifuge fractions of typhoid bacilli ground in a mortar were the ame as those described in the previous paper. A anular insoluble sediment P_1 was obtained which ontained much less protein than its supernatant S_1.

These substances were examined both for their nzymic activity against a number of carbohydrate ubstrates, and for their ability to protect mice against xperimental infection by *Salmonella typhi*. The fraction P_1 protected mice but lost this property when eated. S_1 did not protect mice.

[The reviewer did not find it possible to understand he significance of enzymic activity of fractions in relation to their immunizing properties. Several apparent missions make it seem possible that this paper may ave suffered in translation.] *D. D. Smith*

GRAS, J. Le phénomène de l'inhibition d'anticorps circulants par hyperimmunisation. [**The Phenomenon of Suppression of Circulating Antibody by Hyperimmunization**] *Rev. d'Immunologie.* 1960, Apr.–June, v. 24, No. 3, 354–66, 6 figs.

A valuable and illuminating study of the production of circulating antibody in the rabbit in the course of immunization is presented. 3 antigens were studied: (i) human red blood corpuscles, group O; (ii) suspensions of *Br. abortus* as examples of particulate antigens, and (iii) horse serum as a soluble antigen.

A dosage suitable for optimal stimulation of antibody formation was chosen. The initial doses were 1 ml. of 50% suspension of red blood corpuscles twice a week; 0·3 ml. of a brucella suspension containing about 2,000 million bacteria per ml.; and horse serum—both thrice weekly. All injections were intravenous and the total dosage in the case of serum varied from a total of 0·9 to 18 gm. over the whole series.

The titres for antibody to particulate antigens were determined by observations on agglutination and those for antibody to horse serum by observations on lines of precipitation in double diffusion plates using serial dilutions of antigen and neat or 1/2 dilution of antiserum. The result in every case was that a maximum antibody titre developed between 20 and 50 days after immunization. This titre fell away markedly after attaining the maximum and only responded slightly to continued injections of antigen even when these were greatly increased in amount and immunization was continued for a year or more. It is argued that since large further dosage of antigen leads to slight increases of antibody, not to its disappearance or diminution, the results observed could not be explained by neutralization and removal of antibody by excess antigen but rather by exhaustion and unresponsiveness to stimulus of the antibody-forming mechanism. This explanation was further supported by the fact that on cessation of administration of antigen at the end of a long course no rise of antibody titre, but a gradual fall, occurred.

J. W. McLeod

FREEDMAN, H. H. **Further Studies on Passive Transfer of Protection against Lethality of Endotoxin.** *Proc. Soc. Exper. Biol. & Med.* 1960, Apr., v. 103, No. 4, 867–9. [15 refs.]

The author has shown that the passive transfer of protection against endotoxin by the serum of endotoxin-tolerant rabbits was not due to adrenal cortical hormone, properdin, or a phagocytosis-promoting factor. A limited protection was given by normal rabbit serum, but not if there was an interval of 3 hours between serum injection and endotoxin challenge, or when the challenge was given intraperitoneally 30 minutes after the serum was injected intravenously. Serum from an endotoxin-tolerant rabbit protected substantially in both circumstances. Heating completely removed protecting activity from normal rabbit serum but not completely from endotoxin-tolerant rabbit serum.

[See also this *Bulletin*, 1960, v. 35, 833, 1050.]

May F. McCallum

HEYMANN, G. Das Properdinsystem und seine Beziehungen zur Immunität und zur Abwehrlage des Organismus. [**The Properdin System and its Relationship to Immunity and to Defence Mechanism**] *Zent. f. Bakt.* I. Abt. Ref. 1960, v. 176, No. 4, 305–35, 1 fig. [Numerous refs.]

A review of the subject.

SURJÁN, Margaret. Untersuchung der eiweissgebundenen Polysaccharide in papierelektrophoretisch getrennten Fraktionen. I. Untersuchung von Pertussis-Immunsera. [**Investigation of Protein-Bound Polysaccharides in Fractions Separated by Paper Electrophoresis. I. Examination of Pertussis Immune Sera**] *Ztschr. f. Immunitätsf. u. Exper. Therap.* 1960, July, v. 120, No. 1, 32–9, 2 figs.

The English summary appended to the paper is as follows:—

"Protein- and glycoprotein-fractions of normal sera of 34 normal adults and 42 hyperimmune sera against pertussis were tested by paper-electrophoresis. In beta- and gamma-globulins both, the protein- and glycoprotein-contents were increased. In a joint investigation of the glycoprotein concentration of the beta, and the gamma-globulin fractions and by grouping the results according to the agglutinin titres of the immune sera, this value increased to 47% in sera with agglutinin titres of 3200 or higher, compared with the 32% found in normal sera. Hence one can conclude that the glycoproteins play some part in the immunity."

SOLOVYOV, V. D. & ALEKSEYEVA, A. K. **Studies on Antiviral Immunity using Tissue Culture Methods. 1. The Susceptibility and Resistance of Lung Tissue Explants to Influenza Virus in Previously Immunised Animals.** *Acta Virologica.* Prague. 1960, May, v. 4, No. 3, 129–36, 4 figs. [12 refs.]

In this study, the growth-characteristics of influenza A and A^1 viruses in lung tissue cultures from normal animals were compared with those in similar explant cultures derived from animals previously immunized by intranasal inoculation of live A or A^1 virus.

Lung tissue from immunized animals did not permit multiplication of the homologous virus strain used for immunization, but the heterologous strain grew to titres comparable with those on normal lung cultures. The degree of this strain-specific resistance varied according to the schedule of immunization and to the interval between completion of immunization and taking the lungs for tissue culture; there was no close relationship with the titre of circulating serum antibodies in the animals from which the tissues were derived.

Animals immunized by intraperitoneal injection yielded lung tissue cultures with considerably less resistance to *in vitro* infection than those from intranasally-inoculated animals.

The degree of tissue-culture immunity could be reduced markedly by increasing the interval between explantation and virus challenge or by changing the tissue culture medium at intervals. "Immune" explants were shown to contain antibody capable of inhibiting haemagglutination and neutralizing egg infectivity of the homologous strain and there was some evidence of active antibody production over the first few days after explantation; much of this antibody remained tissue-bound. The waning of tissue-culture immunity appeared to coincide with a fall in detectable antibody and with the growth of new cell generations at periphery of the explants; these daughter-c apparently did not inherit resistance to infection.

[The introduction to this paper is largely concer with the question of a purely cellular component immunity in host-parasite relationships, independent humoral mechanisms. The results obtained do li to advance this hypothesis, but do, however, sugg the possible importance of local mechanisms of humo immunity in resistance to influenza infection.]

Derek Hobso

COHN, Z. A. & MORSE, S. I. **Functional and Metabo Properties of Polymorphonuclear Leucocytes. Observations on the Requirements and Con quences of Particle Ingestion.** *J. Exper. M* 1960, May 1, v. 111, No. 5, 667–87, 8 figs. [17 re **II. The Influence of a Lipopolysaccharide En toxin.** *Ibid.*, 689–704, 10 figs. [20 refs.]

I. The authors have previously described a quan tative technique for studying phagocytosis by rab polymorph leucocytes [this *Bulletin,* 1960, v. 35, 38 They now describe investigations of the effect of t suspending medium on phagocytosis of *Staphylococ albus,* and of the phagocytosis on the metabolism the leucocyte.

Both normal serum and glucose were needed phagocytosis in the system studied. Arsenite a iodoacetate inhibited phagocytosis but cyanide a fluoride did not. Ingestion of killed *Staph. albus* w followed by an increase in the glucose utilization, lac acid production and oxygen consumption of the leuc cytes. The glycogen content of the cell first decreas and then increased steeply. These effects were m marked when the coccus:leucocyte ratio was 4:1.

Leucocytes that had ingested killed cocci were subs quently able to ingest live *Staph. albus* at a greater r than control cells; they still needed serum for th action and they were still unable to ingest *Staph. aure*

II. The addition of a preparation of bacterial lip polysaccharide (Pyrexal) to the phagocytic mixtu resulted in increased phagocytosis and intracellular ki ing of *Staph. albus;* this effect was only demonstrab after the leucocytes had been exposed to the Pyrex for 20–30 minutes. The effect of Pyrexal was increas at low serum concentrations. Pyrexal increased t metabolic activities of the leucocytes in the same w as the ingestion of bacterial particles.

R. E. O. Williams

Miscellaneous

RNARD, C. C. **Bibliographical Citation.** 2nd Edition. [Reprinted with Revisions from *The Librarian,* 1950, May, July & Aug., v. 39, 105–10; 171–5; 125–9.] 20 pp. [33 refs.] 1960. London: James Clarke & Co. Ltd., 33, Store Street, W.C. 1. [2s. 6d.]

This reprint is now issued in a convenient form, hich can be kept ready for use by scientific authors ho have a mind for it. The subject is important ough, for neglect of the common-sense rules and inciples of bibliographical citation is a serious defect, ading to obscurity and mistakes. It is unfortunate at authors who would not tolerate untidy techniques the laboratory, and who go to great lengths to scribe exactly what they have done, sometimes fail to rry that care into the other techniques of exposition. Barnard, as the Librarian of the London School of ygiene and Tropical Medicine for many years before s untimely death, had long experience of his subject, d had given it much serious thought. In this booklet explained its importance and gave detailed informa- on on the conventions and the reasons why they have en adopted. In the introduction he defined some of e terms used, and in succeeding sections he discussed e citation of manuscripts, printed books and periodi- ls. He followed this with an extended section on the breviations of titles of periodicals, and went on to scuss the arrangement of citations in lists.

The object of bibliographical citation is to help the reader to original sources of information, and as these sources may be in any of a large number of languages, it is essential that the citations should be capable of exact interpretation by readers all over the world. Agreed procedure is therefore essential, and Barnard in this short essay has clarified this procedure; it should be read by all scientists who publish original papers, and by all editors. *Charles Wilcocks*

De Wijn, J. F. & De Haas, J. H. Groeidiagrammen van 1–25 jarigen in Nederland. [**Growth Diagrams at Ages 1–25 Years in the Netherlands**] 30 pp., 11 figs. [25 refs.] English summary. Leiden: Nederlands Instituut voor Praeventieve Geneeskunde, Wassenaarseweg 56. [Fl. 2.50.]

The diagrams are graphs in which comparisons are made of heights and weights at various ages, for each sex. There are also some comparisons with other countries. A summary in English gives the outlines of the findings, but the text is in Dutch. Readers who do not understand the Dutch language, however, can obtain much information from the 11 diagrams, which have legends in English, and from the 5 tables which give detailed figures. *Charles Wilcocks*

Book Reviews

HOSH, Birendra Nath [F.R.C.P. & S., etc.] **A Treatise on Hygiene and Public Health with special reference to the Tropics.** 14th Edition. Edited by Rabindra Nath Ghosh, M.B., B.S., D.T.M., D.P.H. pp. xv + 940, 164 figs. 1959. Calcutta 1: Scientific Publishing Co., 85, Netaji Subhas Road, India. [Rs.22.50; 40s.]

This well known text book has now attained its 14th lition. It is over 150 pages longer than its predecessor; extra chapters account for part of the increase.

The subject matter is contained in 31 chapters and 3 ppendices. There are over 160 diagrams and illustra- ons, most of which are clear and to the point.

The attainment of a 14th edition is evidence in itself at a book continues to serve its readers faithfully and ell. Perusal of it confirms this inference. In general, e standard is high and the information conveyed, dequate. But for the next edition, which will assuredly e called for, the Editor may consider whether a little imming might not be a good thing.

The book opens with an interesting chapter on public ealth administration in England and Wales and in India. he matter is naturally highly condensed and it is well known that condensation may mislead. This tendency is shown on page 8 where the statement is made "The birth of a child" [in England and Wales] "must be notified at once to the health visitor to visit the woman". The actual procedure is not quite so direct as that. Under the Public Health Act, 1936, Sect. 203, a birth must be notified to the medical officer of health. It is then for him to detail such member of his department, usually, but not necessarily, the health visitor, to visit the mother and infant if he thinks such a course advisable.

The chapter on water is sound and that on air and ventilation contains all the student of general public health need know of the subject. Industrial hygiene is well described in chapter III. Chapter IV, on the soil, is of somewhat doubtful utility. The slimming process might begin here, allocating short excerpts of the relevant parts to the chapters on water and housing and dropping the remainder.

Nutrition is treated well and comprehensively. In the chapter on diet in India sage recommendations are made which should ensure that those who can afford it will have an adequate diet even if it should be predominantly vegetarian. For Europeans living there the necessary modifications in their customary dietary are indicated.

The only criticism which might be made is that the calorific value of all diets is rather higher than would appear to be necessary under the circumstances.

In the chapter on the disposal of refuse, Fig. 30, wheelbarrow (p. 263), might well be scrapped in favour of a photograph of a sanitary dustbin. In chapter XII, disposal of human excreta, there is a drawing (Fig. 34) of a fly-proof receptacle for faeces (p. 273). It consists of a latrine bucket cover of which the lid is so arranged as to fall automatically into place when the user rises from the seat. The automatic fall is ensured by having a stop on the back standard which keeps the lid off the vertical. It accordingly must be supported on the back of the user of the latrine. In the experience of the reviewer few persons will tolerate this: the lid is accordingly wrenched off if the latrine is a public one.

On page 268 there occurs the following sentence: "Moreover, there is the possibility of infection with ova of hook-worm since people generally go about in the villages without any shoes". The ova of the hook-worm do not infect—the word "ova" should read "larvae".

In this chapter the valve closet, which has been obsolete for over 50 years, is given half a page. All this and the relevant figure (40) (p. 286) could well be eliminated. The wash-out closet is also obsolete and could follow the valve closet into the limbo. The chemical treatment of sewage could be further condensed. Perhaps a mere reference to this as an example of a method which failed to implement its theoretical usefulness would suffice.

Mental hygiene occupies two chapters, XVI and XVII. As chapter XVI merely acts as an introduction to the more voluminous chapter XVII it would seem advantageous to coalesce them. The reference to psychological theories is of doubtful value. In psychology as in other branches of human endeavour a little knowledge may be more dangerous than no knowledge at all. The student is unlikely to suffer from the elimination of this section of the chapter.

Chapters XVIII and XIX deal with infants and school-children. Table II (p. 372) of chapter XVIII would be of greater value if the causes of maternal death in India were given in terms of the international classifications. In this table anaemia is stated to account for 30·53% of 488 maternal deaths in 28 hospitals. Few European obstetricians would agree that anaemia would play such a large part in maternal mortality, but conditions in India may be different. It is a point worthy of further investigation. The chapter on the school health service is adequate.

The chapter on climate and meteorology occupies 26 pages; far too many. It could gain by drastic condensation.

Disease prevention runs from chapter XXI to XXV. Outstanding are the descriptions of malaria, hook-worm disease and leprosy. In hook-worm disease, surprisingly, there is no reference to the use of tetrachlorethylene as an anthelmintic for hook-worms—or to its use in combination with oil of chenopodium.

The account of insecticides is complete and well up to date.

In the description of the treatment of rabies only a cursory reference is made to antirabies serum. T WHO scheme of treatment receives no detailed ment

Rural health services constitute the content of cha XXV. The administrative instrument for the promo of the health of rural dwellers is the health centre wh functions are listed under 9 headings, *viz.*, V Statistics, Environmental Sanitation, Communica Disease Control, Maternal and Child Health, inclu Family Planning, Public Health Laboratory, Sch Health, Health Education, Nutrition, Medical Care.

The staffing of a health centre to serve 20,000 pe seems to be thin, especially for a rural area wh environmental sanitation is non-existent or quite ina quate. But for vast areas of India such an establishm may represent the height of medical luxury for a c siderable time to come. It is encouraging to see that author of the chapter is aware of the limiting effec paper work on the doctor's ability to carry out preventive duties. Another point well made is the n for integration of the various authorities' services if health centre concept is to fulfil its promise.

The chapters devoted to environmental sanitation rural areas, the sanitary control of fairs and festivals camp sanitation bring to a focus in each particular c the general principles to be applied under the circu stances. The West has nothing to compare with some the religious festivals of India where anything up t million pilgrims may participate in ceremonies extend over a month. Many of the devotees are housed temporary quarters and the problem of providing suita sanitary arrangements is formidable.

Chapter XXIX on vital statistics and statistical meth is, in the reviewer's opinion, much too comprehens for inclusion in a book on general health. It occu about 50 pages. Elimination of the more elabor calculations and methods would not diminish the va of the book as a whole.

The terminal chapters dealing with social medic and health education give the reader just enough inf mation on these subjects to stimulate his interest induce him to range further afield.

This edition is, in a way, a memorial to its distinguis author, who died on 3rd November 1957 while prepar it. It is a memorial of which any sanitarian might jus be proud. The criticisms which have been made in review in no way detract from the stature of the bo as a whole, which records for posterity the intellect status of its eminent author and offers to the stud a unique survey of the whole field of public hea administration such as no single writer is likely accomplish in future years. *J. Balfour Kir*

WITTS, L. J. [C.B.E., M.A., M.D., Sc.D., F.R.C [Edited by.] **Medical Surveys and Clinical Tria Some Methods and Applications of Group I search in Medicine.** pp. x+328, 17 figs. 19 New York. Toronto. London: Oxford Univers Press, Amen House, Warwick Square, E.C.4. [3

The advances in medical knowledge from gr methods of investigation are fairly recent, and there a dearth of books which describe these methods comprehensive and readable form. Difficulties of nom clature have reflected uncertainty about the nature "group" medicine and have hampered its accepta

the profession and its presentation as a teaching ject. Some describe it in the terms of classical epiiology, but many students find the old concepts of st factors, crowding and dispersal and so on and the occupation with infectious disease a little artificial. rthermore the term "epidemiology" would logically nfine the subject to surveys of disease incidence and uld thus exclude clinical trials. The other term "social dicine" has to some a faintly undesirable connotation. The editor of this book has rightly avoided such trictive labels and has emphasized the importance of thodology rather than subject-matter. He has kept ecially in mind the difficulty of medical readers in sping principles, many of which appear to run counter their clinical training.

Part I deals with methods. Successive chapters cover neral principles, diagnosis in group research, including full bibliography on the important subject of observer or, prevalence surveys, retrospective and prospective dies, follow-up studies, clinical trials (3 chapters) d operational research. Part II deals with the appliion of group methods to genetics, nutrition, child velopment and health, chest diseases, cardiovascular eases, diseases of the joints, mental illness and tropical eases.

All the writers are acknowledged experts and their ntributions are for the most part lucid and authoritae. There are, inevitably, some inequalities arising from mposite authorship. The variety of styles adds to the erest of the book, but in one or two chapters the esentation is a little ambiguous or rather too dogmatic. apter 6 covers some of the same ground as the two ceeding chapters on clinical trials, but otherwise ere is no appreciable overlapping.

The second part of the book is perhaps less useful an the first. Many fields are not mentioned, yet others e reviewed in detail with a great number of references. ese chapters may soon become out of date and might ore suitably have been published as summary articles the appropriate journals. It would have been better, a book of this limited size, to show in more general ms how group methods have been successfully applied d the special problems of group investigation in each rticular field. References could have been kept to the nimum necessary for purposes of illustration. The apter on child development and health is among the ost readable and instructive, with its all too unusual mission of mistakes made and its account of difficulties ercome in the Oxford Child Health Survey.

This book will be widely read by students and by edical men of every kind, and not least by research orkers who wish to widen their knowledge of group ethods through a review of their applications in fields her than their own. It is likely to be the first of many itions. *A. S. Fairbairn*

ANLON, John J. [M.S., M.D., M.P.H.] **Principles of Public Health Administration.** 3rd. Edition. 714 pp., 41 figs. 1960. St. Louis: C. V. Mosby Co. London: Henry Kimpton, 134, Great Portland Street, W.1. [78s. 6d.]

The fact that this 3rd edition contains 714 pages com- ared with the 506 pages of the first which appeared in 1950 is an indication of the expanding horizons of public health. New emphasis is given to chronic diseases, accidents, mental health, diseases of addiction, medical care and to general social services. The book is neatly divided into 4 parts: Introductory Chapters; Administrative Considerations; Pattern of Public Health Activities in the United States and a small one on the Future. There are 32 chapters in all, the largest number being in the part dealing with the pattern of public health activities.

Though the history and political background of the health services of the United States differ materially from those of Britain yet the principles, problems and objectives in both countries are fundamentally similar.

The introductory chapters provide a brief commentary on world population increase and give much interesting detail about the United States Public Health Service and the Children's Bureau, a separate organization. The former has developed out of the Marine Hospital Service which in 1900 had a budget of $1,371,000 compared with one of over $300,000,000 for the USPHS now.

The long chapters on "organizational considerations", "personnel factors" and "public relations" are full of wisdom based on long and varied experience. They can be read with profit by any British administrator. Shortages of staff and the attendant difficulties are apparently more acute in the U.S.A. even than in Britain.

Protagonists of the economic justification for public health work will find much supporting evidence in the chapter devoted to this subject. The complexities of the system of local government in the U.S.A. which British visitors find extremely baffling are explained clearly. The main facts about world health problems are admirably compressed into 10 pages. The chapter on fiscal management contains something of value for everyone with responsibility for spending public money. The short chapter on the future pin points what still remains to be done to ensure satisfactory public health standards.

There is a good index and a bibliography at the end of each chapter but they are confined almost entirely to American publications.

It is a good and readable book which can be recommended with confidence to all engaged in the administration of departments of public health.

Allen Daley

POOL, W. A. [M.R.C.V.S.] [Editor.] **The Veterinary Annual.** First Year. pp. xxiv + 363, illustrated. 1959. Bristol 4: John Wright & Sons, Ltd., The Stonebridge Press, Bath Road. [42s.]

The object of this book as its name implies is to give an annual survey of the recent scientific literature and developments in the veterinary and allied fields. While this type of work cannot and is not intended to replace the necessity for reading individual papers on specific subjects it should save a lot of time and prove useful as a general reference.

This first edition covers a very wide field and deals with current advances in veterinary work in many parts of the world as well as practice in Britain. There are up-to-date references to many diseases which are common to man and animals, such as tuberculosis, brucellosis, organisms of the pleuro-pneumonia group, virus infections, etc., and the book should prove useful as a quick means of referring to recent developments in this field. The immense volume of annual literature which appears on the subject dealt with in this book must make it very difficult to decide what to include and what to leave out and only time and experience will solve this problem.

The book is primarily intended for the veterinarian but it should prove a useful work of reference to all those interested in the wider aspects of comparative medicine. *J. Carmichael*

WILDFÜHR, Georg. **Medizinische Microbiologie, Immunologie und Epidemiologie. Vol. I.** pp. xv + 619, numerous illustrations. 1959. Leipzig C1: Georg Thieme, Hainstrasse 17/19, Aufg. C. [DM 86.60.]

This substantial textbook on medical microbiology, immunology and epidemiology is published in two volumes, of which this is the first. The table of contents includes the material which will appear in the second volume, *i.e.* that dealing with spirilla, spirochaetes, viruses, protozoa, fungi and worms.

The book presents a very comprehensive survey of the literature of the subject. About a hundred pages are devoted to the phenomena of immunity and rather more than a third of this deals with blood-grouping, including all the complexities of its more recent developments.

There is a very large number of illustrations both in black and white and in colour: many of the latter are excellent, but some are indifferent.

There is a certain lack of balance in the book, as, for example, nearly 70 pages are devoted to the salmonellae, including a 12-page table in which the antigen structure in accordance with the Kaufmann-White scheme and biochemical reactions of every salmonella which has been described are recorded, whereas only 15 pages are devoted to the pasteurellae, notwithstanding their great interest from the historical point of view and in respect of their immense pathogenic potentialities. There is a great deal too much detail in this book, some of it of little importance, for it to be a suitable book for a student, but it is an excellent book of reference as it contains much information which is not easily brought under review, as, *e.g.* the SHRÖER series of cultures for differentiation of diphtheria and diphtheroid bacilli, to which frequent references are made in the German literature. These are fully described and the appearances illustrated in a coloured plate (page 540, Table 26). Other examples are the explanation of the all too numerous abbreviations which lead to confusion in the literature of the Wassermann and other serological reactions related to the diagnosis of syphilis (pages 114–127): the description of many media in common use in Germany often mentioned in German literature which are u miliar to the workers in Britain; and again, the ta about the relative efficacy of the different anti-tube lous drugs in various forms of tuberculosis (page 6

The value of the book as a book of reference limited meanwhile by the relegation of the index bibliography to the second volume, but the marg notes indicating the content of each paragraph helpful.

A weak aspect of the book is the discussion of physiology and biochemistry of bacterial growth; there is no serious attempt to discuss the respirat activities of bacteria. *J. W. McLeo*

PARISH, H. J. [M.D., F.R.C.P.E., D.P.H.] **Antise Toxoids, Vaccines and Tuberculins in Prop laxis and Treatment.** 4th Edition. pp. x + 2 numerous illustrations. 1958. Edinburgh: Londo E. & S. Livingstone Ltd. [For The Wellco Foundation Ltd.] [30s.]

This book gives in a clear and concise form all basic information on immunology needed by any p titioner whose duty it is to advise on and carry vaccination procedures, serum prophylaxis and thera The language used throughout is simple and the p tical procedures required for active and passive imm ization are clearly described. Throughout the book accepted theory on each aspect of the subject is lined very briefly so that it should be readily poss to apply immunological knowledge in a rational logical manner.

The scope of the book is in the use of sera of vari types in passive immunization, prophylactics for act immunization and biological preparations for di nostic purposes, such as tuberculins and dilute toxi Other biological products such as sera and antig used for laboratory tests are not dealt with.

In the first section active and passive immunizat are defined and the characters and application of b types outlined. There follows a description of h vaccines and sera should be administered. Inoculat technique is detailed and special attention is devo to the sterilization of needles and syringes. The aut points out that " many reactions which are ascribed the serum or prophylactic are really due to bacte infection ". The first section ends with a chapter serum reactions and measures to avoid or treat th

The preparation of specific antisera is describ including the refining process and the standard requi by the *Therapeutic Substances Act* (*Therapeutic S stances Regulations*, 1952, H.M. Stationery Office). the antitoxic sera, that against diphtheria is discus most fully and is taken as a representative serologi product. The process is followed from preparation toxin and toxoid immunization of horses, testing antitoxin, to the indications for prophylaxis and tre ment, and the doses used. All the other commonly u antitoxic sera are described, as well as a number antibacterial sera, the latter being included as being general interest, since as the author says " the disea

ey were made to combat are now treated, with vary- g success, by chemotherapy ". The section on passive mmunity is concluded with a very useful chapter on e use of adult and convalescent serum and of gamma obulin in the treatment of a variety of virus diseases. In dealing with active immunization diphtheria again s pride of place. The Schick test is described, illu- rated, and the possible results interpreted and evalu- ed as a guide to immunization requirements. The rious diphtheria immunizing agents are compared th regard to their efficiency as antigens and their fety. Particular reference is made to aluminium con- ining prophylactics such as APT and the risk of an sociated poliomyelitis.

Other active immunizing procedures which are des- ibed and evaluated in some detail are those against ooping cough and tetanus.

Tuberculin testing is of increasing importance in view the work on BCG now being carried out. This test described in its different forms, those being most voured are the Mantoux, and the Heaf multiple punc- re tests. The Heaf test has the advantage of being inless and as it involves only one operation it is suit- le for large surveys where many tests are performed. ere follows an account of BCG and vole vaccines cluding instructions for carrying out immunization d the factors influencing selection of those who ould be protected.

The concluding part of the book is devoted to immu- zation against virus infections. Most of a chapter is voted to smallpox vaccination procedure and regula- ns, and another chapter is devoted to poliomyelitis. This book can be recommended to senior students d graduates. It gives the clearest instructions about actical procedure and the principles are described d discussed so effectively that the reader will under- nd, not only the application of present knowledge, t also developments which will occur in applied mmunology. *D. D. Smith*

EDICAL RESEARCH COUNCIL. **Report of the Medical Research Council for the Year 1958–1959.** *Cmnd.* 1082. pp. viii + 330, 11 figs. on 8 pls. 1960. London: H.M. Stationery Office. [15s. 6d.]

This Report of the Medical Research Council for the ar 1958–1959 is again of vital and absorbing interest. The form of this Report largely follows the pattern ed in recent years although one or two minor changes ve been introduced ".

There is an account of some particular developments scientific policy, chief among which are proposals in major fields: clinical research, tropical medicine re- arch and mental health research. Most of the volume devoted to summarized accounts of the very numerous searches carried out at institutions and by individuals der the Council's auspices. References to the scientific blications which contain full accounts of these re- arches are included in the report. Indexes of (1) ain subjects of research programme, (2) personal names,) establishments and (4) committees are appended.

Of particular interest and importance to many readers will be a series of articles entitled *Some Aspects of Medical Research* which have been selected for review out of a large number of research studies which the Council now supports. These articles have been prepared in conformity with the intention of the Council " that every important subject coming within the Council's field should be dealt with in this way once in a few years ". To give a reasonably balanced picture of these researches these articles of necessity make references to the contributions made by workers unconnected with the Council. The subjects of these excellent and important articles are:—(1) *Occupation and coronary heart disease* (pp. 25–28), (2) *Studies on the chemotherapy of tuberculosis in East Africa and India* (pp. 28–34), (3) *Clean air in operating theatres* (pp. 34–38), (4) *Human population genetics* (pp. 39–46), (5) *Chromosome abnormalities and disease in man* (pp. 46–52), (6) *New applications of electron microscopy* (pp. 52–55), (7) *The structure of viruses* (pp. 56–60), (8) *The structure of muscle in relation to the mechanism of contraction* (pp. 60–64), (9) *Interferon: the prospects for an anti-viral agent in man* (pp. 64–67), (10) *The arthropod-borne viruses* (pp. 67–72), (11) *The plasma kinins* (pp. 72–75), and (12) *Some factors in the problem of inattention* (pp. 75–80).

It is of much interest to know that these 12 articles were published in booklet form by H.M. Stationery Office under the title *Current Medical Research*, on 20th September, 1960 (price 3s. 6d.). *M. E. Delafield*

ANDERSON, C. L. [B.S., M.S., Dr. P.H.] **School Health Practice.** 2nd Edition. 530 pp., illustrated. 1960, St. Louis: The C.V. Mosby Co. London: Henry Kimpton, 134, Great Portland Street, W.1. [45s.]

The aims of the School Health Service in Britain and in the U.S.A. are similar but there are important differences in emphasis and procedures.

The American aim, to quote the author of this book, is to be judged by " the extent to which it modifies persons in their understanding and practice of health principles ".

To those familiar with the American scene the book will be of great interest and value: even to those unable to understand fully the technical terms peculiar to that country's educational system many new ideas will be given. By and large, Americans take their school health activities very seriously. In many of their large schools, similar to those in Britain called " comprehensive ", there is a health director and " health " is a major subject for " graduation " from a senior high school at the age of about 18.

American schools provide no medical treatment apart from grave emergencies: their duty is limited to calling the parents' attention to the children who ought to see a doctor. The health examination form, required on admission to an elementary school, can be filled up, at the parents' expense, by the private family doctor. Every State has its own minimal requirements but local Boards of Education can, and do, go beyond the minima. After entrance there may be no further routine health examination except for the scholars engaging in inter-school

athletics, but there are frequent consultations between the teachers, the parents and the school nurse, if there is one, to select children to be presented to the school doctor for special examination. There are few whole-time school doctors as "except in metropolitan schools, health guidance and supervision by a physician do not exist". There is, however, much part-time medical service and a desirable aim is 250 medical service hours a year for each 1,000 pupils.

The lay element is numerous and well trained. Many have taken university courses in health education and when they become health directors of schools they generally spend about half their time in teaching health in the junior and senior high schools. In the elementary grades such teaching is usually left to the class teachers.

American schools are developing "health guidance" for groups and health "counseling" for individual students.

In Britain an important part of the work of a school doctor is to select children who are so handicapped physically or mentally as to need special education. Though there is much in the book about the handicaps of children the conclusion is reached that "most handicapped children can be fitted into the regular school organization". There is little mention in the book of special schools though there are some quite good ones in the U.S.A.: special classes are thought by the author to be adequate.

There is a good section on the history and evolution of the school health services. A school health programme was started in Boston in 1894.

The philosophy underlying school health work in the U.S.A. is that primary responsibility for the health of the school age child rests with the parents and the teaching should be designed to prepare the child to make the proper decision throughout his life on matters affecting his health.

Health education should be interwoven throughout school life with all phases of the school programme. "*Health education* means the growth within a child of his ability to understand health knowledge and to utilize and apply meaning to it".

There are good schedules of instruction at different ages and lists of suitable films and class demonstrations.

The book deals comprehensively with the development of the normal child, with departures from the normal, organization, control of communicable diseases, accidents, school buildings and school lunches.

There are few misprints but among them is the date when Edwin CHADWICK was active (p. 22) and the name of Professor GROUT is wrongly spelt (p. 35).

Allen Daley

SWAROOP, Satya [M.A., Ph.D., M.P.H., F.N.I.]. **Introduction to Health Statistics for the Use of Health Officers, Students, Public Health and Social Workers etc.** With a foreword by James M. MACKINTOSH, M.D., LL.D., F.R.C.P. pp. xix + 343, illustrated. 1960. London. Edinburgh: E. & Livingstone Ltd., 16–17, Teviot Place, Edinbu [40s.]

Although the writer of the foreword states that book "is to be commended also as a textbook" it is a textbook in the usually accepted sense but rather, the author puts it, "a brief account, for those who t part in administering this great enterprise [collection tabulation of health statistics], of what is actually h pening in the process". "No definition of the t health statistics has been agreed" and the term he statistics in this book is what is usually understood vital statistics and epidemiology. The book is in th main sections (1) Laying the Foundations, which co the recording and tabulation and the account of statis impinging on health; (2) Health Statistics Administrati covering the legislation, record systems, sampling organization of statistics in public health departme (3) Analysis and presentation of data. American f enquiries have been taken to illustrate the various asp of the problem of obtaining basic data and the rec mendations by various committees of WHO on proced are quoted. The American and WHO procedures not always capable of being implemented in most ar

In a book covering such a wide range of topics th are, naturally, points on which differences of opin can occur. The author states that "No evidence more convincing to the layman than adequate statist when they are presented properly in the form of chart This is quite contrary to the experience of the reviev diagrams can easily be misinterpreted, and not only the layman. The author makes free use of figures has included a chapter on charts and diagra "Another common mistake leading to wrong interpr tion is to begin the vertical scale above zero". This true for diagrams representing numbers but the auth unfortunately, has illustrated the statement by a se of rates where it is not necessary to begin the scale zero. Figure 19.3e contains 2 lines which are labelled although it is easy to guess which is whi This chapter on graphs could be improved and examp of how not to draw graphs might be instructive to reader. In the estimation of population by the geome method it seems, to the reviewer, easier to take $r = r$ of population growth rather than r = rate of grow thus $P_{51} = r^{10}P_{41}$ instead of $P_{51} = (1 + r)^{10}P_{41}$. In American example quoted to illustrate the life ta method for follow-up studies the subjects who died w only exposed to risk for half a year according to calculation for the death rate. No adjustment to number exposed to risk is necessary for finding either central or life-table death rate.

The author has achieved his object in reviewing pattern and development of vital statistics and epidem logy but has made little attempt at critical appraisal the procedures. In some places the book could pruned, *e.g.* the long list of possible reasons for a bi marriage, death or divorce certificate could have b omitted.

W. J. Martin

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